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SACRAMENTO RIVER FLOOD CONTROL SYSTEM EVALUATION, PHASES II–V

PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT/ENVIRONMENTAL IMPACT REPORT

US Army Corps
of Engineers
Sacramento District

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**PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT/
ENVIRONMENTAL IMPACT REPORT**

SACRAMENTO RIVER FLOOD CONTROL SYSTEM EVALUATION, PHASES II-V

prepared by

Sacramento District, Corps of Engineers

and

The Reclamation Board, State of California

May 1992

**PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT/
ENVIRONMENTAL IMPACT REPORT**

SACRAMENTO RIVER FLOOD CONTROL SYSTEM EVALUATION, PHASES II-V

( ) Draft Programmatic Environmental Impact Statement/Report (EIS/EIR)

(X) Final Programmatic Environmental Impact Statement/Report

Responsible Agencies:

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The Reclamation Board (Board)
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Name of Action: (X) Administrative ( ) Legislative

Abstract: This study was authorized by the Energy and Water Development Appropriation Act of 1987 (Public Law 99-591) to evaluate the integrity of the Sacramento River Flood Control Project levees and, if necessary, determine the Federal interest in reconstruction work to restore the Congressionally authorized levee design. The study area includes the Sacramento River and tributaries from Red Bluff to Collinsville and was divided into five phases. This programmatic EIS/EIR describes the alternative plans, resources in the area, potential impacts of the alternatives on these resources, and mitigation strategies. Alternative plans include drainage improvements, raising levees, cutoff walls and stabilizing berms. Unavoidable impacts to environmental resources will be mitigated to minimize or compensate for the impacts. The discussion is general in scope since further detailed analyses will be performed for each phase of the study and environmental documents will be prepared.

DRAFT PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT/ ENVIRONMENTAL IMPACT REPORT

SACRAMENTO RIVER FLOOD CONTROL SYSTEM EVALUATION, PHASES II-V

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1.0 SUMMARY

1.1 Project Description. - The Sacramento River Flood Control Project consists of approximately 1,000 miles of levees plus overflow weirs, pumping plants and bypass channels that protect communities and agricultural lands in the Sacramento Valley and Sacramento-San Joaquin Delta (see Plate 1). The Sacramento River Flood Control System Evaluation is being conducted to determine the long-term integrity of the flood control system for the Sacramento River and its tributaries. It was initiated after the 1986 flood event severely stressed the existing levee system in the study area, caused levee failures, and raised the question of levee reliability.

The Sacramento River Flood Control System Evaluation, authorized by the Energy and Water Development Appropriation Act of 1987, is divided into five phases (see Plate 2). The first two phases include the most heavily populated areas, the Sacramento Urban and the Marysville/Yuba City areas. The final three phases will evaluate areas in the Mid-Valley, Lower Sacramento and Upper Sacramento.

1.2 Major Conclusions and Findings. - The major conclusions and findings of this study are as follows: Technical studies indicate that leveed reaches of the Sacramento River Flood Control System do not meet the design conditions approved by Congress. Various structural alternative plans exist to reconstruct these segments to restore (but not increase) the design conditions. Once work sites are identified, specific alternative plans will be selected based on technical, economic and environmental criteria.

1.3 Areas of Controversy. - A number of comments were received during the review process for the Draft Programmatic EIS/EIR questioning the appropriateness of using a Programmatic approach. The comments reflected the viewpoint that environmental documentation for the Evaluation should have taken the form of one, all inclusive, detailed EIS/EIR for the entire Sacramento Area Flood Control System as a whole. The Corps considers the Programmatic approach to be the most appropriate way to document environmental impacts associated with this evaluation.

1.4 Unresolved Issues. - There are no unresolved issues at this time.

1.5 Relationship to Environmental Requirements. - The exact relationship of the levee reconstruction work in the area to applicable Federal, State and local environmental requirements will be identified during the final design process after specific work sites are selected. Additional coordination with agencies will assist in final classification of the relationship to the requirements listed in Sections 1.5.1 through 1.5.3. For this Programmatic EIS/EIR, the proposed work is in compliance with the following requirements. The compliance categories used

in this evaluation are assigned based on the following definitions:

Full Compliance - all requirements have been met for the current stage of reporting on the design and construction underway.

Partial Compliance - some requirements completed and some remain to be met.

Noncompliance - all requirements remain to be met.

Not Applicable - the statute, Executive Order, or other policy is not applicable to the project.

1.5.1 Federal Requirements

National Historic Preservation Act of 1966, as amended; Archeological and Historic Preservation Act of 1974, as amended (16 USC 469 et seq.); Archeological Resources Protection Act of 1979; Preservation of Historic Properties; Abandoned Shipwreck Act. These Acts require management and protection of historic properties and cultural resources located on lands administered by the Federal government or associated with Federally assisted or licensed projects.

Clean Air Act (42 USC 7401 et seq.). This Act establishes comprehensive air quality standards governed by a permit system that is enforced primarily by state and local agencies.

Clean Water Act, Section 404 (33 USC 1344 et seq.). Section 404 of this Act regulates discharges of dredged or fill materials into the waters of the United States.

Coastal Zone Management Act (16 USC 1451 et seq.). Not applicable.

Endangered Species Act (16 USC 1531 et seq.). This Act requires consultation between the Secretary of the Interior and other Federal agencies to ensure that a Federal agency action is not likely to jeopardize the continued existence of Federally-designated endangered species.

Estuary Protection Act (16 USC 1221). Enacted to protect, conserve and restore the estuaries of the United States, this Act authorizes specific studies for potential acquisition of estuaries and encourages states and local jurisdictions to consider estuarine values in their comprehensive planning efforts.

Federal Water Project Recreation Act (16 USC 460-1 (12) et seq.). This Act establishes development of the recreational potential at Federal water resources projects as a full project purpose.

Fish and Wildlife Coordination Act (16 USC 661). This Act requires any Federal agency proposing to modify any stream or other water body to first consult with Fish and Wildlife Service (FWS) and the state agency responsible for wildlife resources.

Land and Water Conservation Fund Act (16 USC 4601-11 et seq.). Not applicable.

Marine Protection, Research, and Sanctuaries Act (22 USC 1401 et seq.). Not applicable.

National Environmental Policy Act (NEPA) (42 USC 4321 et seq.). This Act requires a Federal agency to prepare and circulate a comprehensive Environmental Impact Statement (EIS) for any major Federal action that will significantly affect the quality of the human environment. An EIS must include a detailed statement of the project's alternatives and environmental impacts.

The NEPA regulations formulated by the Council on Environmental Quality (40CFR 1500-1508) require that, to the fullest extent possible, a federal agency shall prepare a Draft EIS concurrently and integrated with other environmental studies including those required by the Fish and Wildlife Coordination Act, the National Historic Preservation Act, and the Endangered Species Act (40CFR 1502.25). The regulations also encourage federal agencies to prepare NEPA documents in cooperation with state requirements to reduce duplication of effort.

This programmatic EIS will be followed by site-specific environmental documentation (see 2.4 Scope and Objectives of the EIS/EIR).

Rivers and Harbors Act (33 USC 401 et seq.). Not applicable.

Wild and Scenic Rivers Act (16 USC 1271). This Act establishes three categories of protection or further study for rivers exhibiting certain qualities. No specific proposal for granting the Sacramento River protected status has been acted on by Congress.

Executive Order 11988, Flood Plain Management. This Executive Order (EO) requires Federal agencies to prepare flood plain assessments for projects located within or affecting flood plains.

Executive Order 11990, Protection of Wetlands. This EO requires Federal agencies to prepare wetland assessments for proposals located within or affecting wetlands.

CEQ Memorandum (August 11, 1980,), Analysis of Prime and Unique Farmlands in Implementing the National Environmental Policy Act (45 Federal Register 58199). This memorandum recommends that an analysis of the effects of Federal agency projects on prime and unique soils be included as part of NEPA documentation.

1.5.2 State Requirements

California Environmental Quality Act (CEQA) (Public Resources Code Section 21000) and CEQA Guidelines (14 CAC Sec. 15000). This Act requires a State or local agency to prepare an Environmental Impact Report on any project it proposes to carry out or approve that may have a significant effect on the environment. The Guidelines allow a lead agency to prepare a joint EIS/EIR to meet the requirements of both NEPA and CEQA.

California Endangered Species Act (Fish and Game Code Section 2090 et seq.). This Act requires formal consultation between the Department of Fish and Game (DFG) and a State lead agency when a proposed action subject to CEQA may affect a state endangered, threatened or candidate species.

1.5.3 Local Requirements

County Policies. Future proposed work for each phase will be coordinated with affected counties to ensure that it complies with all pertinent county policies for the areas.

1.6 Reports to be Incorporated by Reference. - The following documents on this project are incorporated by reference:

U.S. Army Corps of Engineers, Sacramento District. 1988. Sacramento River Flood Control System Evaluation, Initial Appraisal Report - Sacramento Urban Area.

A reconnaissance level evaluation of the integrity of the project levees providing flood control for Sacramento, West Sacramento and Natomas. The evaluation provides a geotechnical assessment of levee embankments and recommends potential reconstruction work required to insure that design flood stages can be conveyed safely by the levees under investigation. Various alternative methods of reconstruction work are described and potential limits of construction delineated. An environmental inventory is included and describes current environmental conditions and potential impacts of the proposed work. The environmental discussion also identifies resources which would require additional study if particular alternatives are selected for implementation.

U.S. Army Corps of Engineers, Sacramento District. 1990. Sacramento Urban Area Levee Reconstruction Project, Environmental Assessment/Initial Study.

An Environmental Assessment/Initial Study (EA/IS) was completed for this project in July 1990. The project consisted of approximately 32 miles of levee reconstruction work in the Sacramento Urban Area. The EA/IS documented the environmental impacts of this work. About 52 acres of wetlands habitat and 24 elderberry shrubs (host to the

threatened valley elderberry longhorn beetle) were impacted. Impacts were mitigated by acquiring a 120 acre compensation site in Yolo County. The mitigation site was designed to provide both wetland and upland habitats. Impacted elderberry shrubs were transplanted to upland areas of the mitigation site. Mitigation plantings were completed during the winter of 1991. Levee reconstruction is scheduled to be completed by November 1992.

U.S. Army Corps of Engineers, Sacramento District. 1990. Sacramento River Flood Control System Evaluation. Initial Appraisal Report - Marysville/Yuba City Area.

A reconnaissance level evaluation of the integrity of the project levees providing flood protection for the Marysville/Yuba City Area. The evaluation provides a geotechnical assessment of levee embankments and recommends potential reconstruction work required to insure that design flood stages can be conveyed safely by the levees under investigation. Various alternative methods of reconstruction work are described and potential limits of construction delineated. An environmental inventory is included and describes current environmental conditions, potential impacts of the proposed work, and mitigation alternatives under consideration. The environmental discussion also identifies future studies.

2.0 PROJECT DESCRIPTION

2.1 Project Purpose and Need. - The Sacramento River Flood Control Project consists of about 1,000 miles of levees, overflow weirs, and flood bypass channels. Flood events in 1983 and 1986 showed that high flows of relatively long duration stressed the flood control system to the point that sloughing of the levee slope, levee failure, and landside boils occurred in the project area. Subsequent engineering evaluations performed in 1988 and 1989 during Phase I - Sacramento Urban Area indicate that levees in this area do not meet existing design requirements and do not provide the Congressionally authorized design levels of flood protection.

The purposes of this evaluation are: (a) to evaluate the integrity of and level of flood protection provided by the existing Sacramento River Flood Control Project levees, (b) to determine whether or not the levees currently function as designed, and (3) if reconstruction work is needed, to determine the Federal interest in proceeding with construction. Due to the size and complexity of the project area, the study area was divided into five phases:

Phase I - The Sacramento Urban Area. The study area is located along the Sacramento and American Rivers in Sacramento, Sutter and Yolo Counties and includes the cities of Sacramento and West Sacramento. Project levees include those along the two

rivers, Natomas East Main Drainage Canal and Natomas Cross Canal. The initial appraisal report was completed in 1988, and the environmental assessment was completed in July 1990. Reconstruction work began in 1990 and is scheduled for completion in November 1992.

Phase II - The Marysville/Yuba City Area. The study area is located in Butte, Sutter and Yuba Counties and includes the communities of Marysville, Yuba City, Linda and Olivehurst. Project levees include those along the Feather and Yuba Rivers, around Marysville and along Wadsworth Canal, Sutter Bypass, and a portion of Bear River (see Plate 3). An EA/IS is scheduled for completion in the fall of 1992 and work is scheduled to commence in the spring of 1993.

Phase III - The Mid-Valley Area. The study area is located along the Sacramento River and Yolo Bypass in Sutter, Yuba, Placer, Yolo and Solano Counties. Cities in the area include Woodland, Davis and Knights Landing. Project levees include those along portions of the Western Pacific Intercept Canal, Dry Creek, Coon Creek Group Interceptor, Yankee Slough, Bear River, Natomas Cross Canal, lower Feather River, Tisdale Bypass, Sutter Bypass, east bank of the Sacramento River from Tisdale Bypass to the Feather River, Yolo Bypass, Cache Creek, Willow Slough Bypass, and Putah Creek (see Plate 4).

Phase IV - The Lower Sacramento Area. The study area is located along the Sacramento River and tributary and distributary sloughs in Sacramento, San Joaquin, Yolo, Solano and Contra Costa Counties. Communities in the area include Freeport, Walnut Grove, Isleton and Rio Vista. Project levees include those along the west and east banks of the Sacramento River from Freeport south to Collinsville. All project levees in the Delta are also considered in this phase (see Plate 5).

Phase V - The Upper Sacramento Area. The study area is located along the Sacramento River in Colusa, Butte, Glenn and Tehama Counties. Chico is the largest urban center; smaller communities include Grimes, Colusa, Butte City, Hamilton City and Tehama. Project levees include those along the west bank of the Sacramento River from Tisdale Bypass to Knights Landing Ridge Cut, both banks of the Sacramento River from Tisdale Bypass north to Vina, and along Cherokee Canal, Butte Creek, Sycamore Creek, Mud Creek and Deer Creek (see Plate 6).

2.2 Project Authorization. - Authorization for the Sacramento River Flood Control System Evaluation was contained in the Conference Report accompanying the Energy and Water Development Appropriation Act, 1987 (Public Law 99-591). Similar language was contained in both the House of Representatives and Senate versions of the Report. The House of Representative's Report states:

> Inspection of Completed Works: Sacramento River Flood Control Project, California. - The committee has included

$600,000 for a comprehensive analysis of the long-term integrity of the flood control system for the Sacramento River and its tributaries in collaboration with the State of California. The Committee is aware that even before the recent flooding, regional flood control officials felt the need for a thorough survey of the system. While it did serve well in the floods and prevented billions of dollars in damages, under stress it validated concerns that in many places remedial work is necessary as soon as possible, as may be enhanced levels of protection. The Corps is directed to report back to the Committee on protection enhancement requirements which it encounters in the review of the project.

The Senate Report states:

> Inspection of Completed Works, Sacramento River Flood Control Project, CA. - The Committee is aware of the need for a comprehensive analysis of the integrity of the flood control system for the Sacramento River and its tributaries. Given the importance of this flood protection system, the Committee believes that such an analysis is warranted.

2.3 Project Approval Process. - The investigation for the first phase resulted in a report entitled "Sacramento River Flood Control System Evaluation, Initial Appraisal Report (IAR) - Sacramento Urban Area," May 1988. Based on the results and approval of this report and two subsequent supporting documents (USACE 1989a; USACE 1989b), the Corps began advanced engineering and design studies. In addition, an Environmental Assessment/Initial Study (EA/IS) and Finding of No Significant Impact (FONSI) were prepared and circulated for comment in November 1989. A supplemental EA/IS that described the final project design was circulated for review and comment in May 1990 and finalized in July 1990.

Each subsequent phase of study would require preparation and approval of an IAR and supporting documents. The investigation for the second phase resulted in a report entitled "Sacramento River Flood Control System Evaluation, Initial Appraisal Report - Marysville/Yuba City Area," January 1990. However, environmental resources and potential impacts of Phases II through V will be included in this single programmatic EIS/EIR. During the advanced engineering and design process, an EA/FONSI or Supplemental EIS/EIR will be prepared for each phase.

2.4 Scope and Objectives of the EIS/EIR. - This EIS/EIR is organized as a "programmatic EIS/EIR" to comply with NEPA and CEQA requirements for all future work under the Sacramento River Flood Control System Evaluation. Levee reconstruction work during Phases II through V may occur at numerous sites in the study areas, but actual sites will not be finalized until advanced phases of engineering and design are completed.

As a result, future work qualifies for coverage under a programmatic EIR/EIS because it comprises a series of "individual (construction) activities carried out under the same authorization...and have similar environmental effects which can be mitigated in similar ways" (CEQ Guidelines 40 CFR 15168(a)(4)) and which have similar alternatives and methods of implementation and occur along the same body of water (NEPA Regulations 40 CFR 1502.4(c)). Although environmental resources vary in character and value from site to site along the project reach, the programmatic EIR/EIS encompasses the breadth of these resources and the potential impacts on them. Similarly, the programmatic EIS/EIR identifies mitigation measures to cover the range of possible future impacts.

When the environmental impacts of future activities are found to be within the range described in this programmatic EIR/EIS, as is generally expected, The Reclamation Board and Corps will prepare a joint Initial Study (IS) and Environmental Assessment (EA) with a Negative Declaration (ND) and a Finding of No Significant Impact (FONSI). However, if at the conclusion of the preparation of the IS/EA, The Reclamation Board and Corps determine that the impacts are significantly different than reported herein, they will prepare a supplemental EIR/EIS as required under CEQA and NEPA, respectively. All of the documents will be available for public review and comment.

This EIS/EIR has the following objectives:

(a) to describe alternative methods of levee reconstruction work for the Sacramento River Flood Control Project and to establish policy for consideration of feasible, environmentally less damaging methods;

(b) to describe and analyze the range of environmental impacts, including cumulative impacts, of completed and proposed levee reconstruction work under the Sacramento River Flood Control System Evaluation;

(c) to identify reasonable and justifiable mitigation measures to eliminate, compensate or minimize significant impacts from proposed work;

(d) to fully comply with NEPA and CEQA in providing the above documentation and analysis; and

(e) to provide a procedural framework for identifying and assessing site-specific impacts and mitigation measures for future levee reconstruction sites that have not been identified at the present.

2.5 Organization of the EIS/EIR. - This document is organized to comply with content requirements of both NEPA and CEQA, generally using the NEPA format to accommodate this joint document.

3.0 ALTERNATIVES

The purposes of this evaluation are to examine the existing flood control system as designed, and to develop a reconstruction plan that would restore (but not increase) the design conditions originally authorized by Congress. Because technical studies determined that the problems experienced resulted from structural inadequacies, alternative reconstruction plans were developed that address these inadequacies but do not increase the authorized design conditions. Alternatives being considered (except for the no action alternative) consist primarily of work on the crown or landward side of the levees, thus minimizing impacts to riverside riparian habitats. However, work on the waterward side is considered in those areas where structures, cultural resources or significant natural resources exist on the landward side. All the alternatives (except no action) would require staging and access areas. A description of the alternatives is given below (see also Plate 7).

3.1 No Action. This alternative would consist of maintaining the project levees in their current condition. This alternative is likely to result in levee embankment problems and potential levee failure that could cause extensive flooding, significant economic damages, and could include loss of life. The flooded areas would be drained following flooding, and no significant long-term adverse impacts to environmental resources would be expected as a result. Significant costs and resources would be needed to repair or replace structures damaged by flood waters.

If no reconstruction work is done, possible future levee breaks could cause a short-term degradation in water quality due to the influx of pollutants from flooded areas. Contact with swiftly flowing floodwaters and prolonged inundation would affect some plant species, resulting in habitat damage. Furthermore, a levee break would likely necessitate extensive levee repairs. Depending on the proximity of the levee break to sensitive environments such as streams or rivers, riparian vegetation, marshlands, etc., the impacts resulting from the repairs could be significant.

Persons residing in areas protected by the levee would be at risk. Public safety impacts would depend on the location and magnitude of flooding, time of day, warning time, ability to evacuate, and effective implementation of an evacuation plan. Sudden levee failure would pose sever public health and safety risks.

Houses within the flooded area would be subject to severe flood damages. Reconstruction of damaged units in the deepest portions of the flood zone may be infeasible.

Flooding would place a heavy strain on the evacuation capabilities of the responsible Federal, State and local agencies. Large-scale destruction of public infrastructure and facilities could occur.

Extensive contamination of public water supplies could occur. Extensive debris from flood swollen waters would be deposited, significantly increasing solid waste disposal needs.

Flooding could have a significant short-term economic effect on local communities due to disruption of business and governmental activities, destruction or disruption of transportation facilities, and temporary dislocation of the local workforce. Damage to recreational facilities within the Sacramento River system would reduce recreation revenues on a short-term basis. Substantial damage to agricultural lands could occur, posing severe individual losses and disruptions in the local, regional and statewide economies. Long-term economic losses are less predictable. Low income areas in the flooded areas would recover less quickly than more affluent areas. The most severely damaged commercial properties, particularly in more marginal areas, may not be reconstructed or reopened.

3.2 Construct Drainage Improvements at or Near the Landward Toe of the Levee Embankment. This alternative would consist of constructing drainage improvements at or near the landward toe of the existing levee embankment. The drainage improvements would require clearing, excavating and constructing gravel drains, within 10 feet of the landward toe of the existing levee embankment. Excess drainage water would be collected and pumped back into the river system or conveyed to existing drainage facilities. In addition, excess water could be allowed to flow overland to collector ditches.

3.3 Raise Levees. This alternative would consist of raising the existing levee embankment in those levee reaches that do not have the minimum required design freeboard above the design water surface elevation. Levee raising would primarily involve widening the levee embankment to the landward side. Levee raising could result in extending the landward side of the levee up to 30 feet. This alternative would require obtaining fill material from borrow areas and from excavation for drainage improvements.

3.4 Raise Levees and Construct Drainage Improvements at or Near the Landward Toe of the Levee Embankment. This alternative would be a combination of 3.2 and 3.3.

3.5 Construct a Cutoff Wall Through Levee. Construction of a cutoff wall through the levee entails digging a trench down the middle, or near the middle, of the existing levee embankment and filling it with slurry (impervious material). This creates a barrier to the movement of water through the levee and foundation and prevents piping of the levee or foundation material. When necessary, water for the slurry may be pumped from the Sacramento River or tributaries. This alternative would require depositing excess levee material in disposal areas and sanitary landfills.

3.6 Construct a Waterside Cutoff Wall. Construction of a waterside levee cutoff wall entails digging a trench at the

waterside levee toe and filling it with slurry (impervious material). This creates a barrier to the movement of water through the levee foundation, preventing the piping of foundation material. When necessary, water for the slurry may be pumped from the Sacramento River or its tributaries. This alternative would require depositing excess levee material in disposal areas and sanitary landfills.

3.7 Construct Drainage Improvements and Stabilizing Berm at Landside Levee Toe. This alternative would include clearing and grubbing the lower half of the landward levee slope and placing drain rock over the lower slope. The drain material would be covered and a berm, approximately 10 to 50 feet wide and 5 to 15 feet high, would then be constructed. Installation of the drain rock serves to strengthen the levee by permitting the drainage of water, while retarding the loss of levee material. The combination of the berm with the drain rock adds strength to the levee embankment and permits drainage of seepage waters without piping of soil materials. The addition of the berm also acts to prevent levee sloughing. Any irrigation or drainage ditches that are adjacent to the landside levee toe would be relocated. Also, this alternative would require obtaining fill material from borrow areas.

4.0 ENVIRONMENTAL SETTING

The project area is located in the Central Valley in northern California and includes project levees along the Sacramento River from Red Bluff to Collinsville. Also included are portions of the American, Feather, Yuba and Bear Rivers, Yolo and Sutter Bypasses, and other minor tributaries. The environment potentially affected by the project consists of low-lying areas of the Sacramento Valley and the Sacramento-San Joaquin Delta and includes channels, riverbanks, levees, berms, flood plains within the levees, immediately adjacent lands, and contiguous riparian woodlands.

Environmental resources that are not likely to be adversely impacted during all phases of the project are discussed in Sections 4.1 through 4.12. Resources that could be adversely impacted are discussed in sections 5.1 through 5.6.

4.1 Climate. - The project area has a Mediterranean type of climate with a long, warm, dry summer season from May through October. This is followed by a cool, rainy season from November through April. Normal annual rainfall for the area is around 15 inches and falls primarily during the months from December through March. During the summer, daytime temperatures occasionally exceed 100 degrees Fahrenheit. The winter temperatures are mild and rarely drop below 20 degrees Fahrenheit. The majority of precipitation in the area is provided by air masses moving in from the Pacific Ocean during the winter months. These storms usually move through the area from the west or northwest. Clear skies predominate throughout most of the year, but storms and fog frequently occur during the winter months.

4.2 Topography. - The Sacramento River Basin is bounded by the Trinity Mountains on the north, the Sierra Nevada on the east, the North Coast Range on the west, and joins the San Joaquin Valley on the south. The Sacramento Valley is the central portion of the basin and extends 150 miles from Red Bluff in the north to Suisun Bay in the south. The valley varies 10 to 40 miles in width and ranges in elevation from about 300 feet above sea level to about 5 feet below sea level. Near the center of the valley, the Sutter Buttes, an old volcanic formation, rise abruptly to more than 2,100 feet and cover approximately 80 square miles of northern Sutter County.

4.3 Geology. - Geologic formations underlying the Sacramento Valley include igneous, metamorphic, and sedimentary rock types, which range in age from pre-Cretaceous to Recent. The project area is situated on vast alluvial deposits that have slowly accumulated over the last 100 million years. The materials have been derived from the surrounding uplands, transported by major streams, and deposited in successive clay, silt, sand and gravel layers on the river flood plains, in local sinks, or within the shallow sea that periodically covered the valley floor. The surface sediments associated with the Sacramento River are primarily of three kinds: the older Victor formation, recent flood deposits, and recent basin deposits.

4.4 Soils. - Soil types along the Sacramento River include soils characteristic of river channels, recent alluvial flood plains, basin areas, and reclaimed Delta islands. Riverwash, found in the river channel and vicinity, consists of drained sandy, gravelly, or cobble deposits. This fairly infertile soil is found primarily in the upper reaches of the project area. Recent alluvial flood plain soils are found in alluvial flood plain areas that are often transversed by channels and subject to overflow. These are poor to moderately drained soils and are suited for a variety of agricultural uses. Basin soils, which are used to grow rice and cereal grains, are found farther inland than the flood plain soils and are poorly drained with a clay to clay-loam surface underlain by clay subsoils. Organic Delta soils average 10 feet in depth and were originally built up from alluvial deposits and later covered by peat and other organic matter. They are excellent agricultural soils because of their high organic content.

4.5 Hydrology. - The Sacramento River is the largest river system in California. It originates near the slopes of Mount Shasta and flows southward to Suisun Bay at Collinsville, draining approximately 26,000 square miles. The major tributaries of the Sacramento River are the Feather River system including the Yuba and Bear Rivers, and the American River.

The Sacramento is an alluvial, meandering river with an average annual natural runoff of about 18 million acre-feet. Variations in streamflow generally occur in response to seasonal precipitation. Peak flows are normally experienced during the winter months of December, January, and February. Little or no

rainfall occurs in the Sacramento River basin during the summer and early fall months; these months have a history of low river flows.

4.6 Air Quality. - The project area is located within the Sacramento Valley Air Basin. The topographic boundaries of the basin, coupled with light winds and atmospheric stability, make the basin highly susceptible to the accumulation of air pollutants. The typical summer circulation system allows transport of pollutants for long distances up and down the valley.

The major air pollution problems in the basin are high concentrations of oxidants and suspended particulate matter. Both pollutants frequently exceed air quality standards. The largest source of oxidants is motor vehicles, and the major sources of suspended particulates are agriculture and lumber industries.

Air pollution has been identified by the environmental community as a significant impact of continuing development in the Central Valley. However, stabilization of the levee system would only restore the Congressionally authorized design conditions and, as a result, is not expected to impact existing growth trends in the flood plain and adjacent areas. Therefore, no significant increase in air pollution is expected.

Minor, short-term increases in dust from construction activities are expected. This will not be a significant impact because the construction contractor will be required to maintain all construction areas free from dust or other air emissions that would cause the local standards for air pollution to be exceeded, or would cause a hazard or nuisance to others.

4.7 Water Quality. - The overall water quality of the Sacramento River and tributaries is generally good, but the quality varies at specific sites due to the effects of variable streamflows and the quantity of local waste water discharges and irrigation return flows. Higher sediment loads and extensive irrigated agriculture tend to degrade water quality. During the spring and fall, irrigation tailwaters are discharged into drainage canals that flow to the river. In the winter, runoff flows over these same areas. In both instances, flows are highly turbid and introduce herbicides and pesticides into the drainage canals. Also, water quality in the distributary channels of the Delta is affected by intrusion of saline sea water, which is of increasing concern as consumptive uses of fresh water continue to increase statewide.

If no reconstruction work is done, possible future levee breaks could cause a short-term degradation in water quality due to the influx of pollutants from flooded areas. Furthermore, a levee break would likely necessitate extensive levee repairs. Depending on the location of the break, construction may cause degradation of water resources. Any proposed construction confined to the levee crown, landside levee slope, or near the

landside levee toe would have little or no impact on water quality since no work would be done in the river. Work on the waterward side could cause temporary increases in turbidity during construction and would require the preparation of an evaluation pursuant to 404(b)(1) of the Clean Water Act. In addition, this type of evaluation would be required if any irrigation ditches or ponds are relocated. A 404(b)(1) evaluation has been prepared to accompany this Draft Programmatic EIS/EIR (see Appendix A). This evaluation would be revised during the final design process for each phase.

4.8 Noise. - Noise is often defined simply as unwanted sound, and noise levels and impacts are interpreted in relation to noise standards for each county. Most project-related work would occur in rural areas. Existing dominant noise sources in these areas range from birdsong and wind to agriculture, roadway and railroad activities. Noise levels near existing communities are typical of low-density urban areas and are primarily traffic related.

Direct noise impacts associated with the alternatives include temporary levee construction activities. Construction equipment would be used at work sites, and truck traffic would transport heavy materials and equipment on area roads. Noise impacts are expected to be insignificant since construction activities are of short duration and typically occur only during daylight hours in sparsely-populated areas.

Some wildlife species might relocate to other areas to avoid construction noise; however, they would likely return to the project vicinity when construction ceases. Also, construction noise during the breeding seasons of some wildlife species could adversely affect reproductive rates. For example, the Swainson's hawk, a State listed threatened species known to exist along the Sacramento River, would be especially sensitive to noise. If Swainson's hawks are found in the specific work areas, construction activities would be delayed near the nesting areas until the young birds have fledged. In addition, destruction of trees containing active nests would be avoided to the greatest extent possible.

4.9 Land Use. - Agriculture is the predominant land use in the Sacramento River basin and along the project reaches in Phases II through V. Row crops, orchards and grain crops are grown on much of the land, and many irrigation diversions are made from the rivers. The project area in Phase II also includes the urbanized areas of Marysville and Yuba City, which include residential, commercial and industrial development. Minor amounts of residential and commercial development occur in or near Rio Vista, Isleton, Walnut Grove, Lock, and Hood. Further north, scattered development is found along the river in small communities such as Knights Landing, Grimes, Colusa, Princeton and Butte City.

The proposed reconstruction work would ensure that the existing levee system meets the Congressionally-approved design

conditions. The work would not enhance the original design levels. Therefore, no significant impacts on land use are expected.

4.10 Socioeconomics. - The study area includes parts of 10 counties in northern California. Table 1 lists these counties and shows that they vary widely in acreage, population and per capita income. Many of the counties are primarily rural and sparsely populated, especially along the Sacramento River. On the other hand, Contra Costa County is highly urbanized and has less rural land.

Table 1/

Counties in the Study Area

County	Area (acres)2/	Population3/	Per Capita Income ($)4/
Butte	1,065,490	182,100	13,512
Colusa	739,740	16,150	16,158
Contra Costa	510,680	802,900	23,011
Glenn	844,160	24,450	14,983
Sacramento	649,780	1,026,800	17,007
San Joaquin	919,180	470,900	14,186
Solano	558,210	339,800	15,639
Sutter	388,480	64,700	13,985
Tehama	1,904,640	49,000	11,890
Yolo	661,760	139,200	17,166
Yuba	409,020	58,900	11,195

1/ Source: California State Department of Finance. 1990. California Statistical Abstract. Sacramento, California.
2/ 1989; includes land and water
3/ 1990
4/ 1988

Agriculture is the main source of employment and tax revenue in the rural counties. The per capita incomes for all counties except Contra Costa were below the State average of $18,763 in 1988. However, none were below the State poverty level.

Public services in the study area are provided by the counties and cities. These services include schools, libraries, roads, utilities and emergency services. The major transportation routes are Interstate Highway 5 and State Highways 99, 45, 20 and 160.

Project construction would provide employment opportunities in the regional areas affected. The total number of employees required will depend on the extent and duration of the construction work in the various phases. Generally, labor cost

for levee work is estimated to be 40 percent of the total project cost. Based on similar Corps projects, and estimated 50 percent will be blue collar skilled, 20 percent will be blue collar unskilled and 12 percent will be in the construction occupation. These employees will be primarily from the regional labor force; only 10 percent of workers are expected to come from outside the regional areas.

4.11 Public Health. - Conditions that can lead to high mosquito populations are water habitats with high levels of organic matter and few predators. These conditions are found in areas such as rice fields, flooded pastures, sewage treatment ponds, irrigation ditches and manmade reservoirs. Local mosquito abatement districts regularly monitor and treat such areas in order to minimize mosquito production. Large populations of mosquitos are a public health concern because they are a nuisance and may carry disease.

Any proposed mitigation plans would be coordinated with the local mosquito abatement district to ensure that local mosquito populations would not be increased as a result of the reconstruction work. Any restored freshwater emergent marsh or open water habitats would be designed and managed to minimize mosquito production. Possible management techniques include stocking the habitat with the mosquito fish (a natural predator), planting cattails and tules rather than smartweed or pondweed, allowing no organically rich effluent to enter the habitat, and applying pesticides as needed.

Since the reconstruction work would be designed, coordinated and managed to minimize mosquito production, no significant public health impacts are anticipated.

4.12 Esthetics. - The esthetic or visual resources of the River are varied throughout its reach, representing a complex setting of islands, riffles, oxbow lakes, vegetative communities, riverside development, and open and confined waterways. Above Colusa, the river and its tributaries meander between a system of levees generally set far enough back from the riverbanks that scenic strips of riparian vegetation border the river. From Colusa to Sacramento, much of the riverside berms are devoid of riparian vegetation, and large portions of the original berms have been eroded so that the riverbanks are now adjacent to the levees. Below Sacramento, the river is fairly slow moving, and the main river, as well as its tributaries and sloughs, are turbid and generally confined between the adjacent levees. There is an absence of riparian vegetation in many sections of this reach.

The River and associated riparian vegetation can provide a quality visual experience for those who visit its banks or travel along its levees. The slow moving rivers, lush riparian vegetation and abundant bird activity could easily be considered the pinnacle of central valley scenery. The esthetic quality is enjoyed by those who go to enjoy the beauty of the river itself

and those who enjoy the esthetic quality while on their way to another destination. Some of the roads along the river and sloughs have been designated as official scenic roadways, including State Highway 160 from Freeport south to Antioch, Isleton Road, roadways along Sutter, Steamboat, and Georgiana Sloughs, and State Highway 45 in Glenn County.

Another component of the esthetic quality of the levees are the sweeping views from the top of the levees to the Sutter Buttes and the surrounding river areas.

Since construction work will involve only repair, it is not anticipated that there will be any long term adverse impacts on the esthetic value of the levees or surrounding areas. Construction equipment and earthmoving activities will likely cause short term diminishment of esthetic values of the areas surrounding the repaired levees. However, once construction is complete and mitigation for vegetation and wildlife impacts is implemented, it is expected that there will be no significant impacts to the esthetic quality of the levees and surrounding areas. Sweeping views from the levees will remain unaffected.

4.13 Hazardous and Toxic Waste Sites. - Hazardous and toxic waste (HTW) sites located in the study area could require special design or construction considerations for the proposed levee reconstruction alternatives. To determine the extent of known HTW sites located in the study area, Federal and State lists were identified and reviewed. The Environmental Protection Agency maintains and updates the Federal "National Priorities List" for uncontrolled hazardous waste sites as required by the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). The latest updated list was published in the Federal Register, August 30, 1990, on pages 35502 through 35525. The State of California Office of Permit Assistance in the Office of Planning and Research maintains and updates the Hazardous Waste and/or Substance Sites List (AB 3750 list). The State Water Resources Control Board, California Waste Management Board, and Department of Health Services contribute data to this list.

This literature review indicated that numerous HTW sites exist in the study area. However, the majority of the listed sites involve minor tank leaks and are probably not located in any areas where reconstruction work would be proposed.

A field reconnaissance and review of aerial photos of specific work sites will be conducted during each future phase of the project to determine if there are any listed or unlisted HTW sites in the project right-of-way. Results of this work and an updated literature survey will be coordinated formally with the non-Federal sponsor and the appropriate Federal, State and local agencies. In addition, the Corps will develop a contingency plan identifying a responsible agency and outlining a course of action in the event that HTW sites are uncovered during construction.

The Corps recently developed agency policy in response to CERCLA, which holds certain categories of individuals strictly liable for all clean up and response costs of any hazardous substances regulated under CERCLA. This policy states that between the Government and the local sponsor, it will generally be the local sponsor's responsibility to assure clean up and pay all response costs of any HTW sites located on a Civil Works project. However, if HTW material exists within the construction area, the Government will determine as soon as possible the extent and nature of the contaminated material prior to construction. If already in construction, the Government and local sponsor shall decide whether to continue construction, terminate construction, or, if possible, redesign the project. In any event, should the Government and local sponsor decide to proceed or continue with construction after considering any liability that may arise under CERCLA, the local sponsor shall be responsible for any studies, investigations, clean up and response costs. In addition, the local sponsor shall operate, maintain, repair, replace, and rehabilitate the project in a manner so that liability will not arise under CERCLA.

5.0 AFFECTED ENVIRONMENT

This section includes the resources that are most likely to be adversely impacted by levee reconstruction work. Existing conditions, potential impacts and general mitigation strategies to avoid, minimize or compensate for adverse impacts are discussed for each resource. The discussion is general for this programmatic document. However, environmental protection is one of the "primary missions of the Corps of Engineers in planning, designing, constructing, operating, and maintaining water resources projects" in accordance with Section 306 of the Water Resources Development Act of 1990. Thus, once specific work sites are identified, FWS, DFG and the Corps would do a detailed Habitat Evaluation Procedure (HEP) analysis for each phase. Reasonable and justifiable mitigation plans would then be developed.

Table two summarizes general impacts associated with the each of the different construction alternatives along with the general mitigation measures that will be used to avoid, minimize or compensate for these impacts.

5.1 Vegetation.

5.1.1 Existing Conditions. There are six plant communities found along the Sacramento River and tributaries in the overall project area. These include valley grassland, agricultural, riparian grassland, shrub scrub, riparian and marshland. The vegetation along the river varies according to differences in local climatic conditions, topography, soil type and land use. In addition, the slopes of the project levees are maintained with annual grasses, and the levee crowns are generally maintained with gravel to provide access for maintenance.

The valley grassland plant community found along the Sacramento River is dominated by a number of annual forbs and grasses such as wild oats, common foxtail, cheeseweed and Italian rye grass. Eucalyptus and valley oaks can also be found.

The agricultural plant community found adjacent to the Sacramento River includes a number of economically important crops. This community includes primarily orchards and field crops such as almonds, pears, peaches, rice, tomatoes, sugar beets, and corn. Most of this agricultural land was converted from native woodland and grassland communities. In some of the areas being evaluated for remedial repair, there is a drainage ditch located along the landside of the project levee. This ditch is generally used to convey irrigation water to nearby agricultural land. Along the edges of the ditch are sections of emergent marsh, annual grasses and some small scattered willows.

Riparian grassland is characteristic of river terrace lands which have had the woody vegetative cover removed. It is a plant succession stage between bare ground and a dominant cover of shrubs and perennial vegetation. Annual grasses, which sprout in early spring and then go to seed, and weedy herbs, which reach maturity in late summer, form the dominant cover. The grasses consist primarily of ripgut grass, fescue, and perennial growing bermuda grass and wild rye. Also called mixed riparian scrub, this plant community occurs on terraces typically 10 or more feet above the water level. It is dominated by shrubs and young trees and has an herb understory. Typical plant species include shrubby vines such as wild blackberry, willows, and young seedlings and saplings of box elder, cottonwood and Oregon ash.

Riparian trees and shrubs occur along the Sacramento River, varying in width from a few yards where the levee is the riverbank, to a flood plain riparian forest several hundred yards wide. The riparian community is a combination of layered and single-story vegetation. The most valuable layered habitat can be divided into three layers. The overstory (topmost layer) is dominated by cottonwood, box elder, valley oak, black walnut, and various willow species. The midstory is composed primarily of elderberry, Oregon ash, black locust, and smaller individuals of the overstory. The understory contains the largest number of species, dominated by blackberry, poison oak, wild grape, wild rose, and numerous grass, forb and shrub species. The single-story riparian areas are similar to the midstory. All of the remaining riparian vegetation is extremely important as fish and wildlife habitat, as well as providing an important contribution to esthetics and other natural resource values of the region.

A habitat type associated with the riparian community is the shaded riverine aquatic. This habitat is found along the river where overhanging or submerged vegetation exists. By definition, at least 10 horizontal feet of vegetation overhangs the water surface at or just above the surface of the water. In a case

Table 2

Construction Alternative	Potential Impacts	Mitigation
Drainage improvements at or near Levee toe	Vegetation -- loss of agricultural crops, grassland, scattered trees and shrubs, marshlands (along relocated drainage ditches)	Avoid, minimize or compensate for vegetation loss.
	Wildlife -- varies depending on location. Temporary diminishment of habitat may force some species into other areas.	Replace or increase habitat values.
	Fisheries -- no impact on river populations. Some impact on canal and ditch populations.	Relocate drainage ditches and irrigation canals, route water through new canals before old ones are filled, avoid or protect woody vegetation, keep construction materials away from the water, size and screens to exclude fish if water must be pumped from a river into the site, refuel on the landside of the levee.
	Rare, Threatened and Endangered Species -- may affect VELB, raptors may affected by snag or tree removal and noise.	Revegetate with elderberry bushes, avoid large trees and snags. Delay construction until after endangered birds have fledged.
	Cultural Resources -- disturbance of know and unknown cultural resources are unlikely.	Avoid or preserve significant sites. Perform a Cultural Resources Survey for each phase.
	Recreation -- could result in temporary closure of facilities such as boat ramps, parking facilities and trails.	Avoid, minimize or compensate for disruption or loss of recreational facilities.
Raise Levees	Vegetation -- loss of agricultural crops, grassland, scattered trees and shrubs, marshlands (along relocated drainage ditches), possible loss of riparian vegetation if work is waterside.	Avoid, minimize or compensate for vegetation loss. Avoid wetlands. Mitigate with a habitat complex when more than one vegetation type is impacted in a location.
	Wildlife -- loss of cover, food and nesting for wildlife. Corridors and buffers may be disrupted. Temporary loss of grassland habitat. Potential loss of shaded riverine aquatic and riparian habitats would affect a variety of wildlife species. Construction activities could disrupt raptor nesting behavior.	Replace or increase habitat values.
	Fisheries -- landside work would have no impact. In the unlikely event that waterside work is conducted, short-term impacts of erosion, sedimentation, decreased water quality, and long-term loss of shaded riverine aquatic and riparian habitat could be expected, resulting in reduced cover and food for fish, loss of nutrients and increased water temperatures. Fish in drainage ditches and irrigation canals would also be affected.	Same as for Construct Drainage Improvements, above.

Construction Alternatives	Potential Impacts	Mitigation
	Rare, Threatened and Endangered Species -- removal of vegetation from top and landward side of levees may remove VELB (Valley Elderberry Longhorn Beetle) habitat, perches for raptors and possibly the palmate bird's beak. Waterside construction may adversely impact endangered fish species.	Same as for Construct of Drainage Improvements, above. Relocate drainage ditches and irrigation canals and route water through new canals before old ones are filled.
	Cultural Resources -- same as for Construct Drainage Improvements, above.	Same as for Construct Drainage Improvements, above.
	Recreation and Esthetics -- same as for Construct Drainage Improvements, above.	Same as for Construct Drainage Improvements, above.
Construct a Through Levee Cutoff Wall	Vegetation -- minimal adverse impact on construction sites. Staging areas will likely be located in agricultural or sparsely vegetated areas where extensive clearing is not required.	Construct protective fencing off large trees and elderberry shrubs within staging areas.
	Wildlife -- Construction activity may impact nesting raptors.	Delay construction until raptor young fledge.
	Fisheries -- No impact in construction sites. Staging areas may affect water quality. Pumps may harm fish.	Size pump size and screens to exclude fish. Staging areas must be designed to ensure that no material enters the water.
	Rare, Threatened and Endangered Species -- some habitat loss may occur at staging areas.	Avoid, minimize or compensate for lost habitat through revegetation.
	Cultural Resources -- same as for Construct Drainage Improvements, above.	Same as for Construct Drainage Improvements, above.
	Recreation and Esthetics -- same as for Construct Drainage Improvements, above.	Same as for Construct Drainage Improvements, above.
Waterside Cutoff Wall	Vegetation -- loss of agricultural crops, grassland, scattered trees and shrubs, marshlands, riparian vegetation.	Avoid, minimize or compensate for vegetation loss. Avoid wetlands. Mitigate with a habitat complex when more than one vegetation type is impacted in a location.
	Wildlife -- loss of cover, food and nesting for birds. Corridors and buffers may be disrupted. Potential loss of shaded riverine aquatic and riparian habitats would affect a variety of wildlife species.	Replace or increase habitat values.
	Fisheries -- same as for Raise Levees, above.	Same as for Raise Levees, above.
	Rare, Threatened and Endangered Species -- vegetation removal may remove VELB habitat, perches for raptors and possibly the palmate bird's beak. May adversely impact endangered fish species.	Same as for Raise Levees, above.
	Cultural Resources -- same as for Construct Drainage Improvements, above.	Same as for Construct Drainage Improvements, above.

	Recreation and Esthetics -- same as for Construct Drainage Improvements, above.	Same as for Construct Drainage Improvements, above.
Drainage Improvements and Stabilizing Berm at Landside Levee Toe	Vegetation -- same as for Construct Drainage Improvements, above. Impact would also depend on location and width of berm.	Same as for Construct Drainage Improvements, above.
	Wildlife -- same as for Construct Drainage Improvements, above.	Same as for Construct Drainage Improvements, above.
	Fisheries -- No impact to riverine fisheries. Would impact fisheries in ditches and canals.	Relocate ditches and canals.
	Rare, Threatened and Endangered Species -- same as for Construct Drainage Improvements, above.	Same as for Construct Drainage Improvements, above.
	Cultural Resources -- same as for Construct Drainage Improvements, above.	Same as for Construct Drainage Improvements, above.
	Recreation -- same as for Construct Drainage Improvements, above.	Same as for Construct Drainage Improvements, above.

where there are significant fluctuations in river flow, the 10' would be measured at the average yearly high water surface elevation. This provides a cooler shaded environment for a portion of the day to fish and other aquatic organisms seeking cover. Cover of this type may also be provided by uneven bank edges or crevices within the bank, providing cool water habitat for fish. Higher food production may be found in these areas. Insects that frequent the overhanging vegetation are food for fish. Also, leaf litter and submerged vegetation provide a detritus base for microorganisms. As a result, this productive interaction of terrestrial and aquatic environments is a valuable cover type for fish.

Marshlands are low wetlands covered with shallow and sometimes temporary or intermittent water. Today's marshlands are a small percentage of the total marshlands that prevailed historically, due to diking and reclamation of the marshlands for agricultural uses. Most of the remaining areas of marshland are found in the lower Sacramento River and Sacramento-San Joaquin Delta areas. The freshwater marsh supports an array of aquatic plants such as bullrush, common tule, cattail, duckwood, soft rush, yellow waterweed, nutgrass, watergrass, saltgrass, and Bermuda grass.

5.1.2 Impacts.

No Action. Under the no action alternative, vegetation types along the project levees are not expected to change substantially. Project levees are periodically cleared of vegetation by either chemical or mechanical means (including burning). This levee maintenance is conducted under existing contract to prevent the growth of dense vegetation and to allow inspection of the condition of the levee. In addition, maintenance often involves repairing levee embankments due to cracks, subsidence, burrowing animals, sloughing, wave erosion, etc. Maintenance practices are not expected to change.

If the levees are not repaired, possible future levee breaks could cause short-term impacts to vegetation. Contact with swiftly flowing floodwaters and prolonged inundation would affect some plant species, resulting in damage and mortality. Furthermore, a levee break would likely necessitate extensive levee repairs. Depending on the proximity of the levee break and subsequent reconstruction to sensitive environments such as streams or rivers, riparian vegetation, marshlands, etc., there could be some adverse impacts, although these impacts are likely to be short term.

Construct Drainage Improvements at or Near the Landward Toe of the Levee Embankment. The impacts of drainage improvements (mainly gravel drains) would vary, depending on location. Generally, impacted vegetation growing landward of the levee toe would include agricultural crops, grassland or scattered trees and

shrubs. Drainage canals that convey irrigation water are often found along the levee toe. Overflow or seepage from these canals sustain bordering marshland vegetation. This vegetation would be affected by drainage improvements that replace or relocate open canals with compacted fill. However, this wetland vegetation would also grow along the margins of the relocated canals.

Raise Levees. This alternative would adversely affect vegetation growing on the existing levee slopes although the impact area is not expected to extend more than 75 feet from the existing levee toe. This area includes a temporary construction area. The extent of the impacts would depend on the location of the work (landside or waterside). In addition, the impacts would depend on the height of levee raising. A higher levee requires a wider base, and more vegetation would be disturbed. Levee raising on the landward side would disturb primarily agricultural crops, grassland and scattered trees and shrubs. Riparian vegetation is not typically found landward of the project levees. Any drainage canals would have to be relocated, and this would impact any marsh habitat associated with the canals. In the unlikely event that waterside construction is needed, shaded riverine aquatic habitat, riparian vegetation and grasses along the levee slope would be adversely affected.

Raise Levees and Construct Drainage Improvements at or Near the Landward Toe of the Levee Embankment. The impacts of this alternative on vegetation would be a combination of the impacts of the two preceding alternatives.

Construct a Cutoff Wall Through Levee. This alternative would have minimal adverse effects on vegetation since construction would occur primarily on the levee crown, which is covered with roadbed material. Construction of this alternative would require access corridors and staging areas in which to mix the slurry material. These areas could be located on either the landward or waterward side of the levee; exact locations would be determined when specific remedial work sites are identified. However, these areas are typically located be in nearby agriculture fields or along sparsely-vegetated berms where extensive clearing is not required.

Construct a Waterside Cutoff Wall. Impacts from this alternative would depend on the proximity of this construction technique to water. Should this technique be used near water, it is likely that shaded riverine habitat, riparian vegetation would be adversely affected. In areas where the water is further from the levee, it is likely that grassland and agricultural lands will be impacted. Staging access corridors will be necessary, but can be located in areas where extensive clearing and removal of woody vegetation is not required.

Construct Drainage Improvements and Stabilizing Berms at Landside Levee Toe. This alternative would be constructed landward of the project levee and impact vegetation in a similar

manner as the drainage improvement or levee raising alternatives. The amount of impact would depend on the location and width of the stabilizing berm. Impacts to grassland and agriculture would involve the removal of grasses along the lower one-half of the levee slope on the landside of the levee and the removal of any vegetation including trees and shrubs along, and adjacent to, the toe of the levee (maximum 75 feet from the toe).

5.1.3 Mitigation. Specific impacts to vegetation would be determined once specific reconstruction work sites are identified. Areas of impacted grassland, agricultural land, riparian grassland, riparian and marshland would be measured, habitat values calculated, and appropriate mitigation measures proposed to avoid, minimize or compensate for the impacts. One possible measure is the purchase and revegetation of marginal or fallow agricultural areas near the impacted site. Also, the grasses found on the existing levee slope, levee crown and temporary construction area would be mitigated by reseeding with native grasses. Marshlands (wetlands) would be avoided, restored or replaced to satisfy the Corps' goal of "no overall net loss of the Nation's remaining wetlands base" as stated in Section 307 of the Water Resources Development Act of 1990 (P.L. 101-640). When more than one vegetation type is impacted in a location, mitigation would involve formation of a habitat complex to replace the habitat values affected.

5.2 Wildlife.

5.2.1 Existing Conditions. A great number of wildlife species exist within the varied habitats of the Sacramento Valley. Diverse and abundant species of reptiles, amphibians, birds, and mammals inhabit the complex habitat created by the combination of valley grasslands, agricultural lands, riparian vegetation and open water. Vegetation is generally used directly for food, nesting, and cover by birds and terrestrial and semi-aquatic mammals and indirectly by supporting populations of prey species important to the food web of the area's ecosystem. In addition, vegetated areas serve as migratory corridors and buffers from urban development.

Reptile and amphibian species are generally associated with the valley grasslands and adjacent riparian areas. Reptiles such as the western fence lizard, the common king snake, and the gopher snake are found in the grassland habitat, while the western pond turtle is associated with riparian habitat. Most of the common amphibians are found in the riparian areas near the water. These include the common bullfrog, the Pacific treefrog, the western toad, and the less common California slender salamander and western spade foot.

Nearly 200 species of birds frequent the Sacramento River and contiguous bottom lands. Some species are common year-round or seasonal residents of the area, while others are migrants or only occasional visitors. The Sacramento basin is important as one of

the prime waterfowl wintering areas in the Pacific Flyway, and the Sacramento Valley's wintering waterfowl population often exceeds 3 million birds. Waterfowl in the valley include the mallard, pintail, widgeon, tundra swan, Canada goose, white goose (snow goose or Ross's goose), and other less common species. The shorebird species such as the spotted sandpiper and wading birds, such as the great blue heron, great egret, use emergent or submerged aquatic vegetation as well as small mollusks, fish and crustaceans.

Passerine or songbirds are found in the riparian vegetative cover along the river because of its excellent food and habitat value. The American goldfinch, the song sparrow, the rufous-sided towhee, and the American robin use the tree, shrub, and herbaceous plant species of this habitat while the western meadowlark, loggerhead shrike, and common crow are found in the grassland and agricultural areas.

Raptor species such as hawks and owls nest within the larger trees and in burrows of the riparian and grassland habitat and feed on small animals that also inhabit the area. The most commonly observed raptors are the red-tailed hawk, northern harrier, American kestrel, barn owls, short-eared owls and burrowing owl.

The upland species found along the river are usually associated with the valley grassland and agricultural habitats. They include the ring-necked pheasant, California quail and mourning dove.

Semi-aquatic and terrestrial mammals inhabiting the area include the beaver, muskrat, river otter, black-tailed hare, ground squirrel, ringtail cat, raccoon, striped skunk, western harvest mouse, and the hoary bat.

5.2.2 Impacts.

No Action. Periodic maintenance practices for the project levee embankments would continue. Therefore, provided that there are no future levee breaks, there would be no additional impacts to fish and wildlife.

However, if project levees are not repaired, possible future levee breaks could cause a short-term degradation in water quality due to the influx of pollutants from flooded areas, affecting wildlife. Contact with swiftly flowing floodwaters and prolonged inundation would affect some plant species, resulting in habitat damage. Furthermore, a levee break would likely necessitate extensive levee repairs. Depending on the proximity of the levee break to sensitive environments such as streams or rivers, riparian vegetation, marshlands, etc., habitat, and therefore, wildlife would be adversely affected.

Construct Drainage Improvements at or Near the Landward Toe of the Levee Embankment. The impacts of drainage improvements would vary, depending on location. Bordering vegetation, if allowed to grow, would provide good cover for nesting and feeding.

Raise Levees. This alternative would adversely affect wildlife species. Removal of vegetation would cause a loss of cover, food and nesting areas for wildlife. Migratory corridors and buffers from urban development would also be disrupted. Landside construction would have fewer impacts than waterside because riparian and shaded riverine aquatic vegetation would be affected much less, if at all. Disturbance or loss of grassland habitat would adversely impact small mammals and raptors, dispersing them to other grassland areas if not already at carrying capacity. However, repopulation by similar wildlife species would occur as the grassland returns to preproject conditions. In areas where orchards are adjacent to construction sites, impacts may be sustained by losses of some fruit trees that are used by perching birds. Also, construction activity during raptor nesting periods could lead to decreased nesting success.

Any loss of riparian vegetation would adversely affect many wildlife species. The riparian forest, with its multi-layered vegetation and high density of plant species, supports the largest populations and most diverse wildlife along the Sacramento River. The diversity of tree growth, cover conditions and close proximity to water provide a variety of habitats and niches. Any loss of plant diversity would adversely affect those species inhabiting the area. Wildlife could move into surrounding riparian areas if not already at carrying capacity. If the surrounding area is at carrying capacity, then wildlife may become stressed and experience some mortality. Most areas will be rehabilitated soon after construction, in some cases, such as grasslands, by the following season. Other habitat types, such as riparian forest, will take longer to recover.

Any loss of shaded riverine aquatic and riparian habitats along the river would adversely impact songbirds and small mammals that use these areas. Cover, nesting habitat and food sources for songbirds would be lost; and cover, food and a portion of the migration corridor for small mammals would be eliminated. In addition, any reptiles and amphibians that depend on this interface of terrestrial and aquatic habitats would be adversely affected.

Any disturbance and loss of riparian vegetation, as well as construction activity, would adversely affect nesting raptors.

Raise Levees and Construct Drainage Improvements at or Near the Landward Toe of the Levee Embankment. The impacts of this alternative on wildlife would be a combination of the impacts of the two preceding alternatives.

Construct a Cutoff Wall Through Levee. This alternative would have minimal adverse effects on wildlife since construction would occur primarily on top of the levee. However, construction activity could adversely affect raptor nesting if it is conducted during the nesting periods. Also, spoil disposal could negatively impact wildlife habitat, depending on the disposal site. Disposal should be done in accordance to guidelines provided by the FWS and the California Department of Fish and Game.

Construct a Waterside Cutoff Wall. This alternative would adversely affect wildlife. Impacts from this construction alternative will be similar to those of Raising Levees.

Construct Drainage Improvements and Stabilizing Berms at Landside Levee Toe. This alternative would be constructed landward of the project levee and impact wildlife in a similar manner as the drainage improvement or levee raising alternatives.

The amount of impact would depend on the location and width of the stabilizing berm.

5.2.3 Mitigation. Impacts to wildlife are directly related to impacts on their habitats. Once specific work sites are identified, exact impacts would be determined. These impacts would be mitigated by increasing the habitat values of designated vegetation types. The impacts would be mitigated for by avoiding, minimizing, rectifying, reducing, and compensating measures. Rectifying measures would include activities such as regrading, reseeding, revegetating disturbed areas while compensating measures would include creation of a new habitat to replace the acreage and values lost.

5.3 Fisheries.

5.3.1 Existing Conditions. The Sacramento River supports an array of anadromous and resident fish species. Anadromous fish use the rivers in the area for adult migration to the spawning areas and juvenile out migration to the ocean. Resident species spend their entire lives in the river. Anadromous fishes in the Sacramento River and tributaries include chinook salmon, steelhead trout, striped bass, American shad and white sturgeon. Resident warmwater fish include smallmouth and largemouth bass, crappie, catfish, bluegill, tule perch and sunfish.

The Sacramento River supports the largest chinook salmon population in the state. Approximately 90 percent of the Central Valley salmon population spawn in this system (Kjelson, 1982). Four genetically distinct races of chinooks presently use the river and associated tributaries: fall-, late fall-, winter- and spring-run. According to Hallock (1987), "Total numbers of salmon that spawn in the Upper Sacramento River system have declined more than 75 percent since the 1950's." Winter-run salmon have experienced the most precipitous decline, and in 1989 the National Marine Fisheries Service listed it as a threatened species under

the Endangered Species Act. Between the four races of salmon and the steelhead trout, some life stages of salmonids occur in the Sacramento River system at any given time.

Adult steelhead trout use the lower and middle Sacramento River as a migration corridor into the upper Sacramento River system during the fall and winter. Spawning occurs in most tributaries. Juveniles migrate downstream primarily in the spring after 2 or more years of rearing in the upstream area. The current steelhead population is estimated at less than half of the population in the 1950's (Hallock, 1987).

There has been an overall decline in steelhead and all races of chinook salmon in the upper Sacramento River System. Factors contributing to the decline of anadromous fish in the Sacramento River system include screened and unscreened pumps, diversion dams, unblocked drains that attract and strand fish, and agricultural runoff that affects water quality. In the upper Sacramento River, decline is occurring primarily among the numbers of salmon that spawn naturally above Red Bluff, not hatchery fish. In the lower Sacramento River System (Yuba, Feather and American Rivers), populations have remained more stable.

While the American shad population has actually increased to several million (FWS, 1976), the striped bass population is declining. Estimated to be 3 to 4.5 million in the 1960's, the bass population declined to between 0.8 and 1.2 million in 1977 (Kohlhorst, 1990). According to Moyle (1972), the continuing decline is apparently due to agricultural and municipal pumping, which interrupts the downstream flow of water to the Delta, increases upstream penetration of salt water, and decreases nutrient flow into the estuary.

Resident warmwater fish, including largemouth bass, crappie, catfish, and others, use river backwater areas where currents are slower and more conducive to their requirements. During some stages of their life cycle, most species may be found along vegetated shorelines of the river and associated sloughs where valuable cover is provided by overhanging and/or partially submerged shrubs or trees (shaded riverine aquatic habitat).

Floodflows of the Sacramento River are diverted into the Sutter Bypass via the Tisdale Bypass, Colusa Bypass and natural overflow, and into the Yolo Bypass at the Fremont and Sacramento Weirs. At the same time, fish species that inhabit the river are diverted into the bypasses and tend to reside along the edges where vegetative cover is available. When flows recede, depressions within the bypasses form temporary pools, and fishes not flushed out of the bypasses are stranded. Because of their intermittent nature, the bypass areas do not support permanent fish populations.

Canals and drainage ditches located on the waterside of the Sutter and Yolo Bypasses are used primarily for irrigation of

agricultural fields and are relatively shallow. The water tends to be warm and have higher levels of salts and pesticides. However, some of these canals and ditches do provide year-round habitat for limited numbers of warmwater species such as carp and catfish.

5.3.2 Impacts.

No Action. Aquatic resources in the Sacramento River and tributaries could continue to decline. Increased water diversions for agricultural, municipal and industrial purposes would probably cause a further decline in these resources. Also, short-term environmental impacts from possible future levee breaks could include lost fishery resources. Water quality might be reduced, affecting fisheries, both as an immediate result of levee failure and as a result of the more extensive levee reconstruction work that would be required subsequent to large-scale failure of the levee system.

Construct Drainage Improvements at or Near the Landward Toe of the Levee Embankment. This alternative would not affect fish populations in the river because no work is proposed for the waterward levee slope. Fish in the existing canals and ditches would be negatively impacted at those sites where reconstruction work requires relocation of existing canals and ditches.

Raise Levees. Landside construction would have no impact on fish populations in the river as long as construction activities do not "spill over" to the waterside. Waterside construction would have both short-term and long-term negative impacts on fish habitat. Short-term impacts may include increased erosion and sedimentation in the rivers and tributaries and degraded water quality due to increased turbidity or spills of petroleum or construction materials into the water. Long-term impacts may include the permanent removal of shaded riverine aquatic and riparian habitat along the river. Loss of these habitat types would reduce cover and food for fish, as well as nutrient input to the aquatic system. In addition, water temperatures near the banks would increase. Both anadromous fish (adults and smolts) and resident fish species would be adversely impacted. Any adverse impact on anadromous fish would be significant because the Sacramento River system populations are severely depressed from historic levels. Impacts to shaded riverine aquatic and riparian habitats can be minimized to some extent if vegetation is allowed to grow back in areas where it is removed. Fish in the existing canals and ditches would be negatively impacted at those sites where reconstruction work requires relocation of existing canals and ditches.

Raise Levees and Construct Drainage Improvements at or Near the Landward Toe of the Levee Embankment. The impacts of this alternative on fisheries would be a combination of the impacts of the two preceding alternatives.

Construct a Cutoff Wall. This alternative would have no impact on fish populations in the river or in existing canals or ditches as long as construction activities take place on the levee crown and there are no spills of slurry into the water. Activities in staging areas on the waterward side would be designed to ensure that no material enters the river or adjacent ditches. Pumps used to obtain water from the river for the slurry could impact some fish.

Construct a Waterside Cutoff Wall. This alternative would have impacts similar to those from Raising Levees. Furthermore, care must be taken so that no slurry spills into the water. Such a spill would adversely affect fisheries.

Construct Drainage Improvements and Stabilizing Berms at Landside Levee Toe. This alternative would not affect fish populations in the river because no work is proposed for the waterward levee slope. Fish in the existing canals and ditches would be negatively impacted at those sites where reconstruction work requires relocation of these canals and ditches.

5.3.3 Mitigation. Impacts to fisheries would be determined once specific reconstruction sites are identified. However, woody vegetation and shaded riverine aquatic impacts will be avoided or protected as much as possible. Areas affected by construction would be revegetated with native species. During site specific impact analysis, distinctions between woody riparian and shaded riverine aquatic habitats would have to be made to avoid "double" impacts identifications.

All refueling would be limited to landside areas. Construction materials would be kept away from the water, perhaps by constructing a small berm around the perimeter of the construction site. Water could be routed through new canals before existing ones are filled. If water from the Sacramento River is used for construction, pumps would be sized and screened to minimize loss of fish. The size of the screens would depend on the size of the pumps needed. Any screens used would conform to DFG standards and National Marine Fisheries Service requirements.

5.4 Rare, Threatened and Endangered Species.

5.4.1 Existing Conditions. The overall area is composed of many different climatic conditions, topography and biological features. As a result, the diversity of plant and animal life is great. A list of the threatened and endangered species that may occur in the Phase II - Marysville/Yuba City area was requested and received from the FWS, Endangered Species Office, in May 1989. A similar list for Phases III-V was requested and received in February 1990. These letters are included in Appendix B. The Federally listed endangered animal species include the bald eagle and American peregrine falcon while the Federally listed endangered plant species include the palmate-bracted bird's beak. Federally listed threatened species include the winter-run chinook

salmon and the valley elderberry longhorn beetle (VELB). In a letter dated March 5, 1991, the National Marine Fisheries Service indicated that there would be no impact on the winter-run chinook salmon as long as no work is done on the river sides of the levees. This letter is also included in Appendix B.

Animals that may be found in the project area and are on the Federal list of candidate species include the tricolored blackbird, white-faced ibis, ferruginous hawk, Sacramento splittail, delta smelt, San Joaquin pocket mouse, San Joaquin valley woodrat, California tiger salamander, California red-legged frog, giant garter snake, Sacramento Valley tiger beetle, and Sacramento anthicid beetle. Plants that are candidates for Federal listing are the Suisun aster, heart-scale, California hibiscus, delta tule-pea, Mason's lilaeopsis, little mousetail, and Colusa grass.

In its letter to the DFG on January 22, 1990, the Board requested initiation of the State consultation process pursuant to CEQA (Section 21104.2) and CESA (Section 2090, Fish and Game Code). The Board requested DFG's written finding based on DFG's determination of whether the proposed project is likely to jeopardize the continued existence of State-listed threatened or endangered species or result in the destruction or adverse modification of habitat essential to the continued existence of any such species.

The Board had determined that the following State-listed rare, threatened or endangered species may be present in the general project area: Swainson's hawk (threatened), western yellow-billed cuckoo (threatened), bank swallow (threatened), giant garter snake (threatened), and Mason's lilaeopsis (rare).

A preliminary review of the California Natural Diversity Data Base also indicates that a variety of State listed species may be present in the study area. See Appendix C, Biological Data Report, for a listing of these species.

5.4.2 Impacts. A brief description of potential impacts to listed threatened and endangered species in the study area is given below. More detailed information is contained in the Biological Data Report in Appendix C.

No Action. Under this alternative, current conditions or trends would remain unchanged; therefore, no immediate impact upon listed species is expected. If severe levee failure were to occur at some future date, it is possible that existing vegetation, such as elderberry shrubs (VELB host), trees and snags (perches for bald eagles), and the palmate bird's beak would be damaged or completely removed by floodwaters and erosion. Water quality might be compromised (affecting fisheries, including winter-run chinook salmon) both as an immediate result of levee failure and as a result of the more extensive levee reconstruction work that would be required subsequent to large-scale failure of the levee

system. Some fish would probably be lost when standing floodwaters subside.

Construct Drainage Improvements at or Near the Landward Toe of the Levee Embankment. This alternative would disrupt vegetation in the immediate construction area and therefore may affect the VELB in locations where elderberry shrubs are destroyed or damaged by construction activities. Trees or snags that provide perching habitat for resident and migrating birds, including the bald eagle, peregrine falcon, and Swainsons hawk, may need to be removed. Construction activities and noise may temporarily deter these raptors from visiting the area within and around these activities. This disturbance could also cause these raptors to permanently abandon their territories or roosting sites. It may be necessary to backfill and/or relocate drainage ditches at the levee toe. This action may disrupt the giant garter snake. The alternative is not expected to affect winter-run chinook salmon since the construction activities would take place on the landward side of the levees.

Raise Levees. This alternative would require removal of vegetation from the top and landward sides of the levee. Some plants would probably also be removed from the waterward side of the levee. In some areas this removal may include elderberry shrubs (host to VELB), trees or snags (perching habitat for the raptors), and possibly the palmate bird's-beak. If safeguards prevent construction materials from entering the water, no impact to fisheries or the winter-run chinook salmon would be anticipated. However, if waterside construction disturbs shaded riverine aquatic habitat or increases turbidity in the river, adverse impacts could be sustained by the fish species.

Raise Levees and Construct Drainage Improvements at or Near the Landward Toe of the Levee Embankment. Impacts to listed species under this alternative are expected to be a combination of the previous two alternatives.

Construct a Cutoff Wall Through Levee. This alternative would require the removal of vegetation and soils from the top of the levee and from any construction staging areas. Since the top of the levee is generally maintained free of vegetation, including elderberries, the VELB would not be affected. The palmate bird's-beak is not expected to be present on the upper part of the levees. Both plants could be affected by placement of construction landings and staging areas. Plants on the landward side of the levee may be adversely affected by diminished access to water caused by the impermeable cutoff wall during periods of high flood stages.

Construct a Waterside Cutoff Wall. Some plants would probably be removed from the activities associated with this construction alternative. In some areas this removal may include elderberry shrubs (host to VELB), trees or snags (perching habitat for the raptors), and possibly the palmate bird's-beak. If

safeguards prevent construction materials from entering the water, no impact to fisheries or the winter-run chinook salmon would be anticipated. However, if construction disturbs shaded riverine aquatic habitat or increases turbidity in the river, adverse impacts could be sustained by the fish species.

Construct Drainage Improvements and Stabilizing Berm at Landside Levee Toe. Impacts to listed species would be similar to those under the second alternative.

5.4.3 Mitigation. Specific impacts would be determined once specific reconstruction sites are identified. A biological data report and biological assessment would be prepared for each phase to assess the project impacts on any Federally endangered or threatened species found at a specific project site. Required mitigation measures would be developed in coordination with FWS, who would then issue a biological opinion on any impacts to listed species. A favorable biological opinion would allow these mitigation measures to be implemented.

Surveys for Swainson's hawk active nests would be done at specific project sites. The DFG would determine if the nests are likely to be affected by construction activities. If the nests are affected by construction, restrictions up to a 0.5-mile radius of the nest would be implemented and construction delayed until after the birds fledge.

5.5 Cultural Resources.

5.5.1 Existing Conditions. Prior to European contact, the central and northern parts of the study area were occupied by the Patwin, Konkow Maidu, River Nomlaki, and Nisenan Indians. Archeological excavations have shown that people either ancestral or similar to these groups have been in the area for at least 4,000 years. Today, the archeological evidence of native American culture includes mound sites with burials, midden and various artifacts. The Delta was inhabited by the Bay and Plains Miwok, which had one of the largest native American populations of any tribe in California.

Although there were earlier explorers and fur trapping expeditions, settlement and development of the Sacramento Valley did not begin until John Sutter's arrival in the Sacramento area in 1839. After the discovery of gold in 1848, communities grew along the river and became trade centers along the routes to the mines. During the early 1850's the Delta was settled by unsuccessful gold seekers who turned to subsistence farming. Ranching and farming were the main occupations of most early settlers; the rivers were used for irrigation and transportation of products to markets.

Early residents attempted to control seasonal floodwaters from the Sacramento River and tributaries by constructing small levees along the river banks. Chinese laborers were hired to

reclaim the Delta, and they built the first system of crude levees around selected islands. Between 1860 and 1866, private reclamation districts were formed and continued levee construction in the Delta. Later, the State and Federal Governments designed and constructed the present comprehensive flood control system to protect the valley against flooding.

The cultural resources activities for each phase include the following steps: (1) reviewing the literature for background information and previous studies, (2) searching the records to identify previously-recorded sites, (3) performing a field survey of previously-recorded sites and unsurveyed areas to locate new sites, and (4) determining potential impacts of alternatives and developing mitigation and preservation strategies. Steps (1) and (2) have been completed for Phases II through V of the evaluation, and step (3) has been completed for Phases II and III. Step (3) is scheduled to be completed for Phases IV and V in 1992 and 1993, respectively. Step (4) would be performed for each phase once specific reconstruction sites are identified.

Preliminary records searches for archeological sites in the study area indicate that at least 189 archeological sites are known to exist in the area. In addition, over 500 historical sites and 70 ethnographic sites have been identified although they have not been verified in the field. It is expected that additional sites will be identified in field surveys.

5.5.2 Impacts.

Based on earlier surveys, previous levee construction has already disturbed many sites in the study area. It is likely that further levee reconstruction could disturb known and unknown cultural resources and have an adverse effect on those resources.

5.5.3 Mitigation. Consultation with the State Historic Preservation Officer (SHPO) has been initiated to determine what additional efforts should be completed in accordance with Section 106 of the National Historic Preservation Act of 1966. As part of future studies, intensive cultural resources surveys will be needed to obtain current information on the condition of previously recorded sites and to identify other historic and archeological sites within the project area. Once the extent and specific locations of construction activities are identified, mitigation of impacts to cultural resources would be accomplished under a Memorandum of Agreement between the Corps, the non-Federal sponsor, the SHPO, and the Advisory Council on Historic Preservation as required by Section 106 of the National Historic Preservation Act of 1966, as amended; 36 CFR 800; and ER 1105-2-100. Consideration must first be given to selecting project alternatives that will allow for the avoidance or preservation of significant cultural resources.

5.6 Recreation.

5.6.1 Existing Conditions. The Sacramento River basin provides a variety of seasonal and year-round recreation activities. Recreation use along the Sacramento River and Delta region can be broken down into two categories: waterborne and shore-based. Waterborne recreation includes fishing, water skiing and boating. Shore-based recreation includes fishing, picnicking, swimming, camping and hunting. According to the Delta Master Recreation Plan (1973), fishing is the primary recreation activity, accounting for about 66 percent of the total use. Pleasure boating accounts for about 21 percent; and the remaining 13 percent is divided among other activities. Although the area is sparsely populated, it is within driving distance of the Sacramento and San Francisco Bay metropolitan areas and therefore, within relatively easy reach of millions of people. Water-based recreation demand is expected to increase steadily as the population base grows; therefore, there will be a need for new and expanded facilities.

Public access to the river for recreational use is limited by the amount of public lands along the river. Wherever it is accessible, the river is heavily used for recreation, and degradation of riparian habitat is common. There currently exists a number of water related recreation facilities along the Sacramento River and its tributaries. These are owned and operated by a number of entities including private businesses and public agencies. The types of facilities found along the river vary in size and degree of amenities, ranging from simple boat ramps with adjacent parking to full fledged marinas. The Delta region probably contains the greatest number and variety of these facilities, including large permanent houseboat mooring facilities.

The Corps has satisfied some of the recreation demand through construction of seven small recreational sites as part of the Sacramento River Bank Protection Project. The sites include Hogback Island Recreation Area (RA) in Steamboat Slough, Georgiana Slough RA in the Delta, Garcia Bend RA and Elkhorn Ferry RA near Sacramento, Sutter RA near Knights Landing, Riverfront Park RA in Marysville, and Live Oak RA on the Feather River. The sites generally include a boat-launching ramp, parking, picnicking, shorefishing, and other day-use facilities.

5.6.2 Impacts. Existing recreational resources in the project area would probably not be adversely affected by the reconstruction work. Depending on the location and extent of work, however, minor, temporary disruptions could occur during construction activities. Possible impacts may include temporary closure of some existing facilities such as boat ramps and parking for rehabilitation, detours, permanent relocation of some facilities, and changes in access to some areas. Other associated disruptions may be increased or delayed traffic due to construction equipment in the area, decreased visibility due to

dust in the air, and increase in noise levels during times of construction.

Recreation was not designated as a project purpose in the 1917 authorization for the Sacramento River Flood Control System, and therefore can not currently be developed as part of this evaluation. Recreation could be added as a project purpose. This would require the preparation of a post-authorization change report. If this were approved, a non-federal sponsor would be required to participate in the design and construction of recreation facilities and assume all operation and maintenance responsibilities of the completed project. The development of recreation facilities would be restricted to project lands and features, with additional lands purchased if required for access, parking, or provision of sanitary or other health and safety facilities. Example facilities include bicycle and pedestrian trails, river or aquatic trails, picnic sites, camping areas or fishing access. These facilities would add to the recreational resources and opportunities in the Sacramento Valley and Delta.

Most of the counties in the region have recognized the need for increased open space and recreation. Some counties, including Sacramento, Solano, Yolo, and Yuba, have indicated an interest in participating as non-Federal sponsors for recreation facilities that may be developed as a result of this project. However, no commitments have been made at this time for new recreational facilities.

5.6.3 Mitigation. Specific impacts to recreation facilities would be determined once specific reconstruction work sites are identified. Steps would then be taken to avoid, minimize or compensate for disruption or loss of any facilities. The development of additional recreation areas could cause potential impacts due to increased use of the overall area. However, if enough additional facilities are constructed, the concentration of use could be reduced and spread over a larger area. Construction of these new and/or additional facilities may result in some temporary impacts on noise, water and air quality. There also may be a disruption of services provided at the various facilities, and some areas may be closed for some time. Mitigation for any loss of land resulting from the development of additional recreation facilities should be included in the overall project mitigation.

5.7 Staging, Access, Borrow and Disposal Areas.

Staging areas are locations where equipment and materials are assembled prior to, and during, new construction work. Activities that may take place at staging areas include vehicle and equipment parking, office trailer parking and material storage. Access areas provide entrances to the construction sites. Borrow areas are areas where material (earth or gravel) is excavated to be used as fill at the construction sites. Disposal areas are locations

designated for the contractor to stockpile excess material; these areas may be temporary or permanent sites.

Once specific work sites are identified, staging, access, borrow and disposal sites would be selected for the each phase of the project. Staging and access areas would be needed for all construction methods. Borrow areas would be cleared of the top 1 to 3 feet of soil where necessary, and this material would be used to construct the levees and stability berms. No borrow sites would be allowed in areas containing cultural resources, significant vegetation or existing streambeds. Disposal areas would be needed only for the cutoff wall alternative; both temporary and permanent sites would be selected. At all staging, access, borrow and disposal locations, the contractor would be required to protect woody vegetation. He would also need to prevent spills of petroleum and construction materials in the water or on land areas. Control of hazardous or toxic materials, such as gasoline, diesel and oil need to run construction equipment will be necessary at each site. Contractors will be required to submit a plan for the proper handling and the management of these hazardous materials to prevent accidents that threaten the safety of workers, the water quality of the adjacent waterways and land areas. This plan shall include strict on-site handling rules to minimize spills, collection and removal from the job site of all pollutants such as sanitary wastes and petroleum products, and a spill prevention and countermeasure plan for each construction site. Staging, access, borrow and temporary disposal sites would be included in the HEP evaluations conducted for the project.

5.8 Irreversible or Irretrievable Commitment of Resources.

Resource uses include the commitment of construction materials for levee work. In addition, fuel and labor resources expended in site preparation, material transportation, excavation and disposal of excess materials would be irretrievable. The locations and extent of the reconstruction work would determine the extent of this commitment. Also, under the no action alternative, significant resources would be needed to repair or replace structures and resources damaged by flood waters.

5.9 Unavoidable Significant Environmental Effects.

Environmental effects of future levee reconstruction work will depend on the selected work sites and the methods actually used. Complete avoidance of valuable biological resources at all work sites will probably be impossible. The environmentally superior method involves landward construction techniques that would maximize avoidance of important resources. In contrast, waterward construction could involve significant adverse effects on riparian vegetation and associated wildlife and fisheries resources. However, any adverse environmental effects that could not be avoided would be mitigated to less-than-significant levels.

6.0 ENVIRONMENTAL ENGINEERING

The Water Resources Development Act of 1986 (P.L. 99-662) granted the Corps authority to implement certain environmental projects. All interested agencies, organizations, and individuals are encouraged to provide suggestions on any environmental projects they believe are urgently needed in the study area. The improvement of fish and wildlife resources and habitat could fit into this category, as well as cultural resources or water quality.

All suggestions received for environmental improvement will be evaluated, and conclusions will be reported in the final EIS/EIR. Summaries of these environmental improvement authorities appear below. Complete information can be obtained by contacting the Sacramento District at the address listed on the abstract page of this EIS/EIR.

Section 704 - Corps of Engineers Fish and Wildlife Conservation Projects. The Corps is authorized to study and conduct projects for beneficially modifying fish and wildlife habitats.

Section 906 - Fish and Wildlife Mitigation and Enhancement. The Corps is authorized to provide mitigation and development enhancement plans for new and ongoing projects.

Section 1135 - Project Modifications for Improvement of Environment. The Corps is authorized to review operating Corps projects to determine the need to modify the structures and operations in order to improve the environment in the public interest.

The general cost-sharing formula required by these authorities is 75 percent Federal and 25 percent non-Federal. For certain nationally recognized resource improvements, the non-Federal cost share for enhancement of such resources is only 25 percent of the operation and maintenance cost. Federal threatened and endangered species, anadromous fish such as salmon, and migratory waterfowl are examples of resources in this category.

The Water Resources Development Act of 1190 (P.L. 101-640) granted the Corps authority to implement a "demonstration program for the purpose of determining the feasibility of wetlands restoration, enhancement and creation..." (Section 307(d)(1)). A demonstration project is currently being developed in the Yolo Bypass near Putah Creek. This Yolo Bypass Wetlands Project is a multi-agency effort involving Federal, State, local and private agencies. However, similar demonstration projects are less likely as part of this system evaluation because the reconstruction work is confined to existing levees. Once specific work sites are

identified, the potential for the sites to accommodate a demonstration project would be evaluated.

7.0 ENVIRONMENTAL COMMITMENTS

Levee reconstruction work as described in Section 3.0 would involve construction activities primarily along the landward side of the levees. This would minimize impacts to environmental resources, particularly vegetation and wildlife resources, which are generally more prevalent along the waterward side of the levee system. The primary direct environmental impact associated with the levee reconstruction alternatives is the removal of vegetation, which, in turn, adversely impacts wildlife resources. Once specific work sites are identified, the exact acres of each impacted vegetation type would be determined. FWS, DFG and the Corps would complete a HEP analysis for each phase and determine the number of acres needed to mitigate for potential impacts of the various alternatives.

Short-term, construction related increases in noise levels, traffic, and dust would be expected as well as short-term degradation of the esthetic appeal of the affected areas. No appreciable impacts to water quality is expected to result from implementation of any of the alternatives. If waterside staging areas are necessary to construct cutoff walls due to adjacent development, appropriate measures would be taken to prevent any water quality or fishery impacts.

Once specific work sites are identified, environmental commitments would be made for each phase of the project. These commitments would include tasks to be completed during preconstruction, construction and post-construction, and a target date for completion of each task would be determined.

8.0 SHORT-TERM VERSUS LONG-TERM EFFECTS

The reconstruction of the Sacramento River Flood Control Project to its Congressionally-approved design levels would continue to protect urban centers, and long-term agricultural productivity.

9.0 GROWTH-INDUCING IMPACTS

The proposed reconstruction work would ensure that the existing levee system meets the Congressionally-authorized design conditions. The work would not enhance the original design levels. Therefore, the work is not expected to impact existing growth trends in the flood plain and adjacent areas.

The Corps has no authority under the present investigation to provide enhanced levels of flood protection. Under existing maintenance and operation agreements for the authorized flood

control project, the local sponsor, The Reclamation Board, is responsible for maintaining and operating the system to insure that the project will function as Congress originally envisioned. The Board is required to make the necessary corrective measures to insure that the design flow can be conveyed safely at the design water surface. To accomplish this, the Board may be required to remove vegetation and deposited material, to raise levees to correct for subsidence as it occurs, to repair levee embankment and foundation seepage areas, to repair levee embankment slope failures, to repair erosion damage, to construct bank protection, etc. All these efforts are directed at insuring that the design conditions of the authorized project are met and maintained. As in the present investigation, Federal Assistance can be requested when the cost of the corrective measures will create significant financial burdens on the maintaining agencies.

10.0 CUMULATIVE IMPACTS AND MITIGATION

10.1 <u>Cumulative Impacts</u>. NEPA implementation regulations define a cumulative impact as "...the impact on the environment which results from the incremental impact of the action when added to other past, present and future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor collectively significant actions taken over a period of time." (40 CFR 1508.7). The regulations require a discussion of project impacts that, when combined with the impacts of other projects, result in significant cumulative effects (40 CFR 1508.25).

CEQA guidelines require the discussion of cumulative impacts to "reflect the severity of the impacts and their likelihood of occurrence". However, this discussion need not be as detailed as the discussion of direct impacts. The guidelines suggest that the discussion should be guided by the "standards of practicality and reasonableness."

The CEQA guidelines further suggest assessing cumulative impacts by identifying a list of past, present, and reasonably anticipated projects producing related or cumulative impacts, or presenting a summary of projections contained in adopted general plans or related planning documents which are designed to evaluate regional or area-wide conditions.

In this case, cumulative impacts are assessed by listing past, present and future projects which, in conjunction with the Sacramento River Flood Control System Evaluation - Phases 2 - 5, may produce significant cumulative impacts along the Sacramento River. A brief description of these projects, their impacts and mitigation is presented below (see the corresponding environmental document for each project for additional details).

10.2 Past Projects. The following projects have been completed, including mitigation activities:

10.2.1 Sacramento River Flood Control Project. This project was authorized in 1917 and consists of over 1,000 miles of levees, overflow weirs, pumping plants and bypass channels that protect communities and agricultural lands in the Sacramento Valley and Sacramento-San Joaquin Delta. Riparian vegetation was directly impacted by this project and largely unmitigated because at that time there were no provisions in the project authorizations requiring mitigation. Indirect impacts to riparian vegetation also occurred due to an increase in private development as a result of increased flood control. Most of these impacts were also unmitigated due to a lack of State and Local laws at the time which required impact mitigation. However, positive socioeconomic benefits have occurred due to greatly reduced flood damages.

Various studies of the historical and present extent of riparian vegetation along the Sacramento River and tributaries agree that less than 2 to 3 percent of historical woody riparian habitat area remains. It is assumed that cumulative effects on wildlife, fisheries and plant species dependent on riparian habitats (terrestrial and aquatic) are directly correlated with the reductions in natural riverbank and riparian vegetation. Given the importance and value of this vegetation to wildlife and fisheries and the reduction to date, any further reduction must be considered a significant adverse impact.

10.3 Ongoing Projects. These projects are currently under construction and/or mitigation activities are in progress:

10.3.1 Sacramento River Bank Protection Project. The purpose of this project is to prevent erosion of the levee embankment section.

First Phase. Construction, consisting of 430,000 lineal feet of levee riprapping, was completed between 1963 and 1974. This construction resulted in the loss of approximately 260 acres of riparian habitat. At that time there were no provisions in the project authorization requiring mitigation. Construction activities were conducted to minimize impacts to the extent possible. As a result of comments from the public, FWS, and California Department of Fish and Game comments, the Corps funded the FWS to review the impacts of Phase I and prepare a mitigation plan. This was completed in 1976, and a recommendation for acquisition and revegetation of 668 acres of riparian lands was made. In 1986 the Corps was authorized to provide mitigation to compensate for habitat impacted during the first phase of construction. This work is currently being accomplished in cooperation with the State of California and the Nature Conservancy.

Second Phase. The second phase of the project was authorized in 1974 and allowed for construction of 405,000 lineal feet of bank protection work. Approximately 320,000 lineal feet of riprapping has been completed to date and approximately 230 acres of mitigation has been provided to date, about 130 acres of which are useable for mitigation. Construction has been delayed on this project since 1989 pending the outcome of State and Federal endangered species consultations.

10.3.2 Sacramento Urban Area Levee Reconstruction Project. This is the first phase of the Sacramento River Flood Control System Evaluation and is currently under construction. The levees are being strengthened but not raised beyond their original design elevation; therefore, no indirect impacts due to increased development are expected to occur. Construction will occur on the landward side of the levees which will minimize environmental impacts. However, 70 acres of upland/riparian vegetation and 44 acres of open water/emergent marsh will be impacted by construction and will be fully mitigated for through the acquisition and development of a 114 acre mitigation site consisting of the aforementioned habitat types.

10.3.3 Cache Creek Settling Basin Project. In 1991, construction was begun to raise the levees surrounding the existing Cache Creek Settling Basin at the entrance of Cache Creek to the Yolo Bypass. This will re-establish the ability of the settling basin to trap sediment, thus substantially reducing sediment deposition in the Yolo Bypass. Coordination with interested agencies has confirmed that no adverse environmental impacts are expected to occur; therefore, no mitigation plan has been developed.

10.4 Future Projects. Reasonably foreseeable future projects have been discussed below:

10.4.1 Sacramento River Flood Control System Evaluation, Phases 2 - 5. These studies will: evaluate the integrity of, and the level of flood protection provided by, the existing SRFCP levees; determine whether or not the levees currently function as designed; and if remedial work is needed, to determine the Federal interest in proceeding with construction. The proposed work does not enhance the original design levels and consequently is not expected to induce growth. Most, if not all, work will occur on the crown and/or landward side of existing levees. Specific impacts and associated mitigation will be addressed in the environmental document for each phase. All impacts will be fully mitigated.

10.4.2 Sacramento River Bank Protection Project.

Third Phase. This project is currently in the planning phase and has not been authorized for construction. However, it is anticipated that construction could begin in 1996. Reconstruction

of 65,000 lineal feet and new construction of 150,000 lineal feet of levee riprapping could occur. The assessment of environmental impacts is in progress.

10.4.3 American River Watershed Investigation (ARWI). The objectives of this study are to define the flood problems in the American River watershed, including portions of Sacramento, the Natomas area and portions of lower Dry and Arcade Creeks, and to develop alternative plans to resolve these problems. Currently, the City of Sacramento has less than a 100-year level of flood protection; a 200 year level of protection is sought. Direct construction impacts resulting from this project include the loss of habitat values on 209 acres of grasslands and agricultural lands, and 17 acres of wetlands in the Natomas area. Both the Corps and FWS agree that these impacts are to be mitigated for by planting and maintaining 213 acres of mixed riparian, upland and wetland habitat in the east Natomas area. Impacts which may result from development in the future will be mitigated for in accordance with a plan being developed and coordinated by the non-Federal project sponsors to comply with existing Federal, State and Local laws, regulations and policies, and implemented by the entity responsible for the impact in the future.

Direct construction and operational impacts in the upper American River area are expected to result in the loss of riparian and upland habitat. These losses would be mitigated for by the acquisition and development of a mitigation site in the project area. The number of acres which will be impacted and the corresponding number of acres needed for mitigation will be described in a forthcoming final feasibility report and EIS/EIR. Project related mitigation would be implemented prior to or concurrent with project construction.

10.4.4 Sacramento Metropolitan Area Project. If constructed, this project would raise levees on the Yolo Bypass side of West Sacramento to increase the level of flood protection. The 400 year level of protection will be provided. A total of 52.5 acres will be directly impacted: 39.4 acres of wetlands and 13.1 acres of uplands. These acres will be fully mitigated for through the acquisition and development of a 52.5 acre mitigation site. Impacts which may result from development in the future will be mitigated for in accordance with a plan being developed by the non-Federal sponsors to comply with existing Federal, State and Local laws, regulations and policies, and implemented by the entity responsible for the impact in the future.

10.4.5 Folsom Reoperation Special Study. This study is evaluating the impacts of increasing the dedicated flood control space in Folsom Reservoir. Study results will be used to decide if Folsom Dam and Reservoir will be reoperated on an interim basis to provide increased levels of flood protection to the Sacramento area until a long-term solution can be implemented. If

reoperation occurs, storage space now used for water supply, power production and recreation would be used instead for flood control with resulting impacts to those purposes and a need for mitigation. The assessment of environmental impacts is in progress. Reoperation has not been authorized.

10.4.6 Yolo Bypass Reconnaissance Study. The purpose of this study was to evaluate the flood problems and potential solutions along the Yolo Bypass from the Fremont Weir south to Liberty Island in Yolo and Solano Counties. The study has been completed. No feasible flood control project were identified.

10.4.7 Yuba River Basin Investigation. The Reconnaissance Study was completed in 1990 and determined that one or more alternatives for a flood control project appear feasible. Of the proposed alternatives, levee raising would have the least adverse environmental impact. Therefore, feasibility studies will investigate levee raising alternatives along the Feather and Yuba Rivers. Environmental impacts assessment has not yet begun.

10.4.8 Yolo Basin Wetlands Project. This project is authorized and construction is scheduled to begin in 1992. The work will be a modification of the Sacramento River Flood Control Project. Approximately 6,000 acres of wetlands will be restored within the Yolo Bypass and the Yolo Basin area. The purpose of the work is to convert a portion of the flood control bypass presently used for agriculture as well as flood control to a wetlands useful for fish and wildlife; and the flood control function will continue undiminished. Physical improvements within the existing flood control system could include modifying existing drainage canals or constructing small dikes and weirs to redirect available water to proposed wetland areas. The wetlands would be a mixture of permanent and seasonal wetlands, uplands, and riparian forest. Environmental impact assessment is in progress; however, impacts are expected to be positive since wetlands and wildlife habitat are being created.

Section 10.4.9 Upper Sacramento River Habitat Restoration. This project is authorized under Section 1135 (b) of the Water Resources Development Act of 1986 which provides for modification of water resource projects to improve the quality of the environment. The proposed restoration is to modify conditions resulting from prior Corps flood control projects including the Sacramento River Flood Control Project. Riparian forest, wetlands, and other components of fish and wildlife habitats will be restored at selected locations in the Upper Sacramento River and tributaries. The project will assist several Federal and State listed, endangered and threatened species and other significant species in decline. Section 10.2.1 Sacramento River Flood Control Project has also been revised to include a reference to this project.

Section 10.4.10 SB 1086. This State legislation provides for a multi-agency work group to provide for restoration of fish and wildlife habitat in the Sacramento River system. To pursue the SB 1086 objectives, the Corps could be directed to undertake a General Investigation of the potential for habitat restoration in the Upper Sacramento River.

10.5 Summary of Cumulative Impacts. Every effort will be made to avoid adverse environmental impacts for Phases 2-5 of the Sacramento River Flood Control System Evaluation, particularly to woody riparian habitat which has been significantly cumulatively impacted. All adverse environmental impacts that can not be avoided would be mitigated below the level of significance and there would be no net loss of riparian habitat values in the project area. Therefore, Phases 2-5 will not add any further impacts to the cumulative impacts described above.

11.0 FINDINGS

Construction activities required to raise levees, relocate ditches, or construct drainage improvements, cutoff walls or berms would be the source of environmental impacts associated with levee reconstruction alternatives. Resources discussed in Section 4.0 are not likely to be significantly impacted. There would not be a significant impact to water quality at those sites away from the river. Short-term impacts relating to increased levels of dust and noise are expected, but there would be no significant long-term impacts.

Impacts to terrestrial resources could include the disturbance or removal of valley grassland, agricultural, riparian grassland, shrub scrub, riparian, or marshland habitats. Removal or permanent alternation of these habitats would adversely affect wildlife, including threatened and endangered species dependent on these habitats for food, cover and nesting.

Aquatic impacts would not be expected in areas of landside levee reconstruction work. Fish in the canals and ditches would be negatively impacted at those sites where work requires relocation of existing canals and ditches.

Future studies will be needed to prepare supplemental environmental documentation for each phase and to determine suitable mitigation plans. In their planning aid letters, FWS recommended that additional studies be conducted in future phases (see Appendix D). Various reports would be prepared during each future phase, and these reports would incorporate the FWS recommended studies. These reports include:

1. A terrestrial and aquatic HEP analysis. This would include an assessment of existing terrestrial and aquatic

resources in the toe drains, canals, borrow areas, and other areas affected by the project alternatives. This would also include an analysis of project impacts on fish and wildlife resources.

2. A Coordination Act Report would be prepared by the FWS. This report would provide background information on existing resources, an analysis of with and without project conditions, and mitigation recommendations.

3. A biological assessment on all endangered and threatened species in the study area.

4. A cultural resources survey of the project area would be necessary in order to complete site evaluations, mitigation plans, and Section 106 consultation requirements.

5. An incremental analysis of mitigation alternatives to determine the most suitable and economically justified mitigation to offset project impacts.

12.0 COORDINATION AND PUBLIC INVOLVEMENT

12.1 Required Coordination. - The information presented in this document will be coordinated with other Federal, State and local agencies. Coordination to date includes:

U.S. Fish and Wildlife Service	Fish and Wildlife Coordination Act Endangered Species Act
U.S. Environmental Protection Agency	National Environmental Protection Act Clean Water Act
California Department of Fish and Game	California Environmental Quality Act California Endangered Species Act
California State Historic Preservation	National Historic Preservation Act - Section 106
Regional Water Quality Control Board	Clean Water Act, Sec 404(b)(1), 401 Certification

12.2 Public Involvement Program. - This section describes the scoping and public involvement process used to gain input from agencies and the public for use and consideration in the draft EIS/EIR, as well as issues and concerns raised by the public regarding the project.

The public comment period was initiated with the publication of Notice of Intent (NOI) in the February 1, 1990, Federal Register.

Several issues were identified in response to the NOI. These issues include impacts of the reconstruction work on downstream flood elevations, erosion and water supplies; impacts of construction activities on noise, dust and local road systems; potential for increased mosquito habitat production and associated risk of human disease; and impacts to vegetation, fish and wildlife resources and threatened and endangered species.

The Reclamation Board also sponsored four environmental scoping meetings to provide information to the public and solicit input. The meetings were held at Marysville, Rio Vista, Colusa and Woodland on September 25, October 10, October 24 and November 1, 1990, respectively. Public concerns at Marysville involved open space, integrity of the watershed, agriculture, interim flooding, the Yuba goldfields and the Cherokee Canal. Comments at Colusa dealt with mitigation, project costs, mosquito control, cumulative impacts, and levee maintenance. Issues raised in Woodland involved mitigation, levee maintenance, interagency conflicts, and local participation.

The Notice of Availability for the draft EIS/EIR was published in the Federal Register in May 1992. In order to meet both National Environmental Policy Act requirements and California Environmental Quality Act requirements, a sixty day comment period was allowed. Three public meetings on the draft EIS/EIR were held in January 1991, at which verbal and written comments were accepted. Comments were also accepted by mail for the duration of the comment period. All comments that were received within 60 days of the published Federal Register notice were incorporated into this final EIS/EIR.

12.3 Statement Recipients. - Copies of the EIS/EIR will be sent to the following agencies and individuals:

Elected Officials and Representatives

Governor of California
Honorable Pete Wilson

United States Senate
Honorable Alan Cranston
Honorable John Seymour

House of Representatives
Honorable Vic Fazio
Honorable Robert Matsui
Honorable John Doolittle

California Senate
- Honorable Pat Johnson
- Honorable Tim Leslie
- Honorable Leroy Greene

California Assembly
- Honorable Chris Chandler
- Honorable B. T. Collins
- Honorable Lloyd Connelly
- Honorable Philip Isenberg
- Honorable Norman Waters

Federal Departments and Agencies

Department of Commerce
- National Marine Fisheries Service
- Environmental Science Services Administration
- National Oceanic and Atmospheric Administration
- National Weather Service

Department of Energy
- Federal Energy Regulatory Commission
- Division of NEPA Affairs

Department of the Interior
- Bureau of Indian Affairs
- Fish and Wildlife Service
  - Division of Ecological Services
  - Endangered Species
- Geological Survey
- Bureau of Land Management
- Bureau of Mines
- National Park Service
- Office of Environmental Project Review
- Bureau of Reclamation

Advisory Council on Historic Preservation

Smithsonian Institution
- Bureau of American Ethnology

Department of Agriculture
- Agricultural Research Service
- Soil Conservation Service
- Agricultural Stabilization and Conservation Service
- Forest Service
- Conservation Service

Department of Health and Human Services
- Public Health Service
- Consumer Protection, Environmental Health Services
- Center for Environmental Health

Water Resources - Mosquito Control

Department of Housing & Urban Development
Federal Housing Administration
Urban Renewal Administration

Department of Labor
Manpower Administration
Department of Labor

Department of Transportation
Federal Highway Administration
Federal Aviation Agency
Maritime Administration

Council on Environmental Quality

Environmental Protection Agency

Federal Emergency Management Agency

State Agencies

State of California
California Attorney General's Office
State Clearing House
Assembly Committee on Natural Resources
Department of Boating and Waterways, Director
Assembly Water, Parks and Wildlife Committee
California Regional Water Quality Control Board
Department of Conservation, Director
Department of Justice
General Manager, The Reclamation Board
Senate Committee on Natural Resources and Wildlife
Wildlife Water Commission

California Water Commission

Department of Fish and Game

State Lands Commission

Department of Parks and Recreation

The Resources Agency

Department of Water Resources

Water Resources Control Board

Local Agencies

County Boards of Supervisors
- Sacramento County
- Yolo County
- Butte County
- Colusa County
- Contra Costa County
- Glenn County
- San Joaquin County
- Solano County
- Sutter County
- Tehama County
- Yuba County

Special Interest Groups

American Fisheries Society
California Trout
California Native Plant Society
California Waterfowl Association
Defenders of Wildlife
Environmental Defense Fund
Friends of the River
National Wildlife Federation
National Audubon Society
Planning and Conservation League
Sierra Club
The Wildlife Society
The Nature Conservancy

12.4 Public Views and Responses. Please see Appendix E - Comments and Responses for a compilation of all comments received and the Corps' response to them.

13.0 LIST OF PREPARERS

Name/Expertise	Experience	Role in Preparing EIS/EIR
Cynthia Adornetto Biologist/Env Res Planner	5 yrs env planning: Corps, USFS, SCS	Report preparation
Felicia Altamimi Biological Aid	2 yrs, Corps	Comment appendix preparation
Lisa Bettencourt Civil Engineer Technician	1 yr, Corps	Comment appendix preparation
Annalena Bronson Env Specialist	9 yrs, DWR/Rec Brd	EIR coordination; review
Elizabeth Davis Sociologist	5 yrs, Corps	Socioeconomic analysis
Jerry Fuentes Historian/Soc Sci	1 yr, Corps	Cultural resources coordination
Dave Gundlach Water Res Planning/ Hydraulics and Hydrology	13 yrs water res studies, Corps	Report review, comment appendix preparation
Fred Kindel Wildlife Bio/ Env Res Planner	25 yrs env planning, Corps; 8 yrs State and private wildlife management	Report review
Leslie Lew Env Res Planner	4.5 yrs env planning, Corps, State Parks	Comment appendix preparation, text revisions, report coordination
Sannie Osborn Archeologist	8 yrs cultural res management, Corps	Cultural resources coordination; report review
Patricia Roberson Env Studies/Env Planner	5 yrs env planning studies, Corps	Report coordination and review, report preparation
Laura Rucoba Biological Aid	1.5 yrs env planning studies, Corps	Data Collection

Donna Stanek Outdoor Rec Planner	10 yrs outdoor rec planning studies, FWS and Corps	Recreation analysis
Lynne Stevenson Tech Writer/Water Res Planner	6 yrs engineering and planning studies, Corps; 10 yrs prof librarian	Report preparation
Tanis Toland Ecologist/Botanist	1.5 yrs, Corps	Biological Data Report
Mike Welsh Biologist/Env Res Planner	15 yrs EIS studies, Corps	Report review and editing

14.0 BIBLIOGRAPHY

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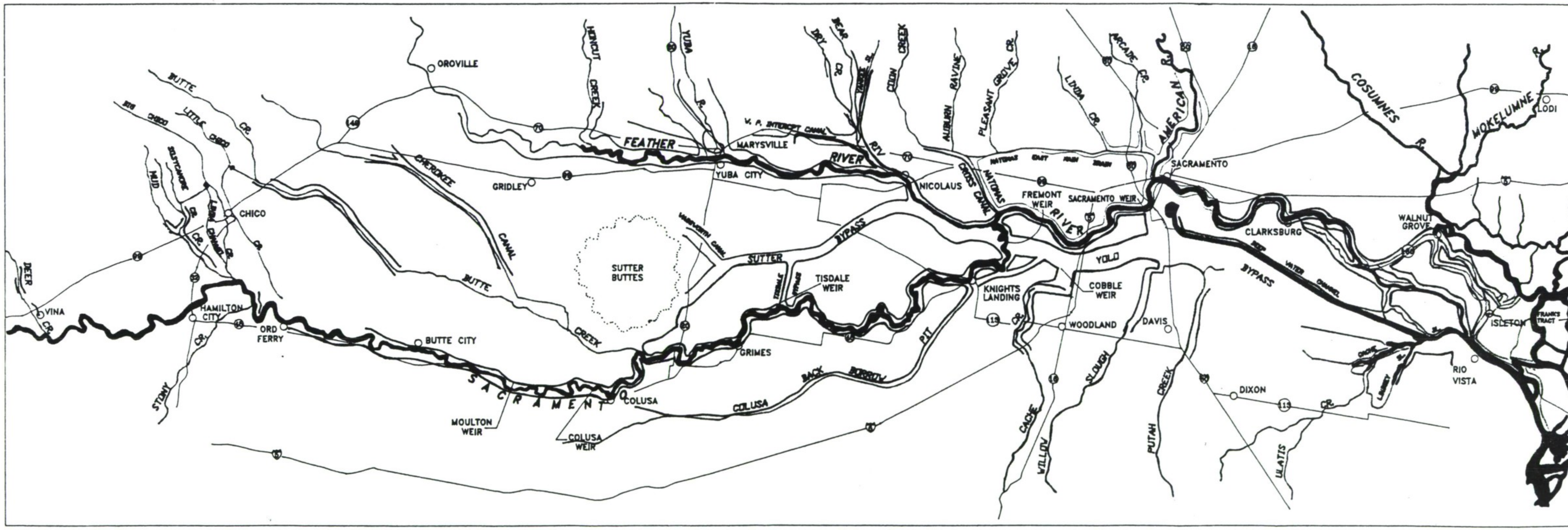
15.0 INDEX



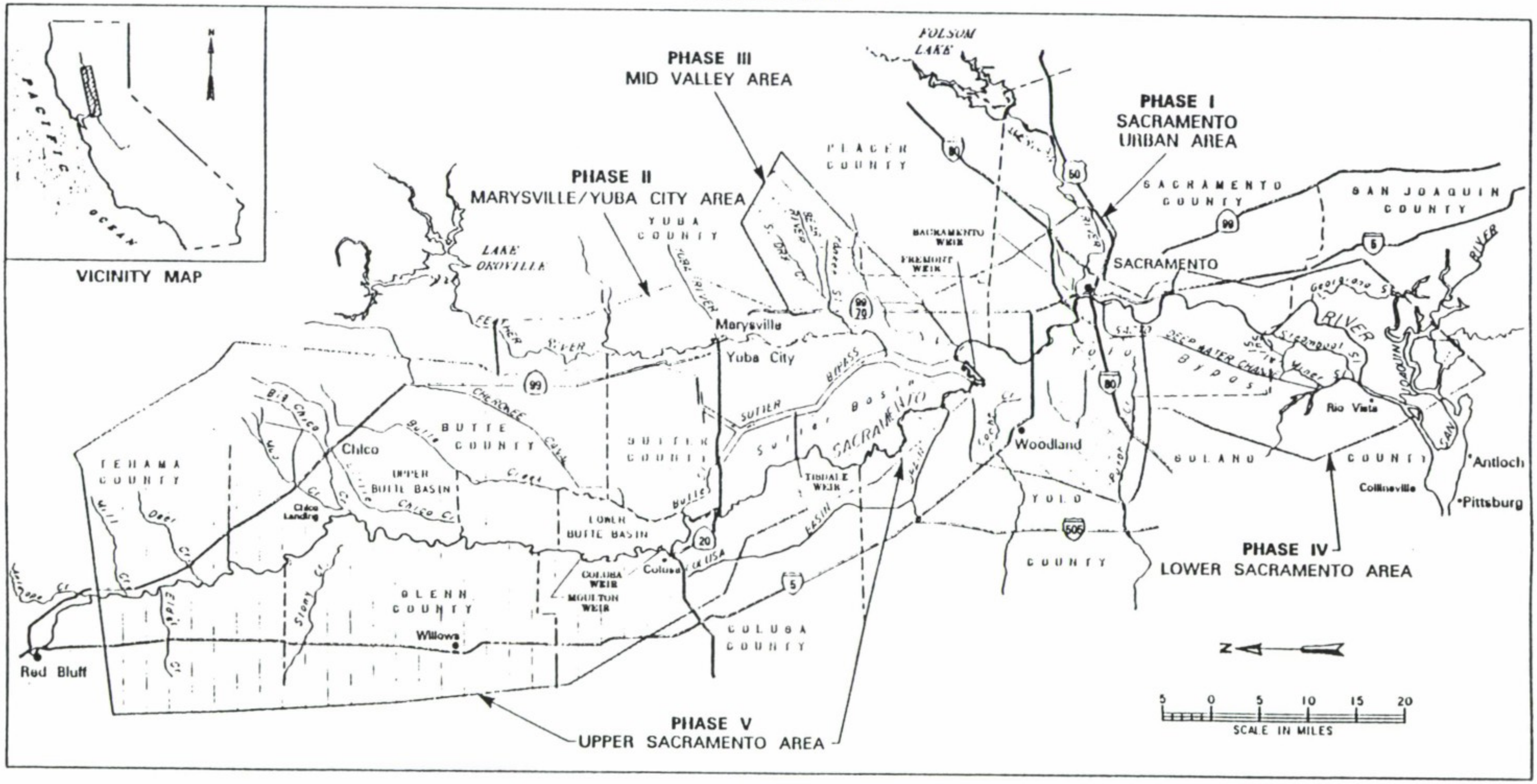
SACRAMENTO RIVER
FLOOD CONTROL SYSTEM EVALUATION

STUDY AREA

SACRAMENTO DISTRICT, CORPS OF ENGINEERS
JANUARY 1991

PLATE 1

SACRAMENTO RIVER FLOOD CONTROL SYSTEM EVALUATION
CALIFORNIA



SACRAMENTO RIVER

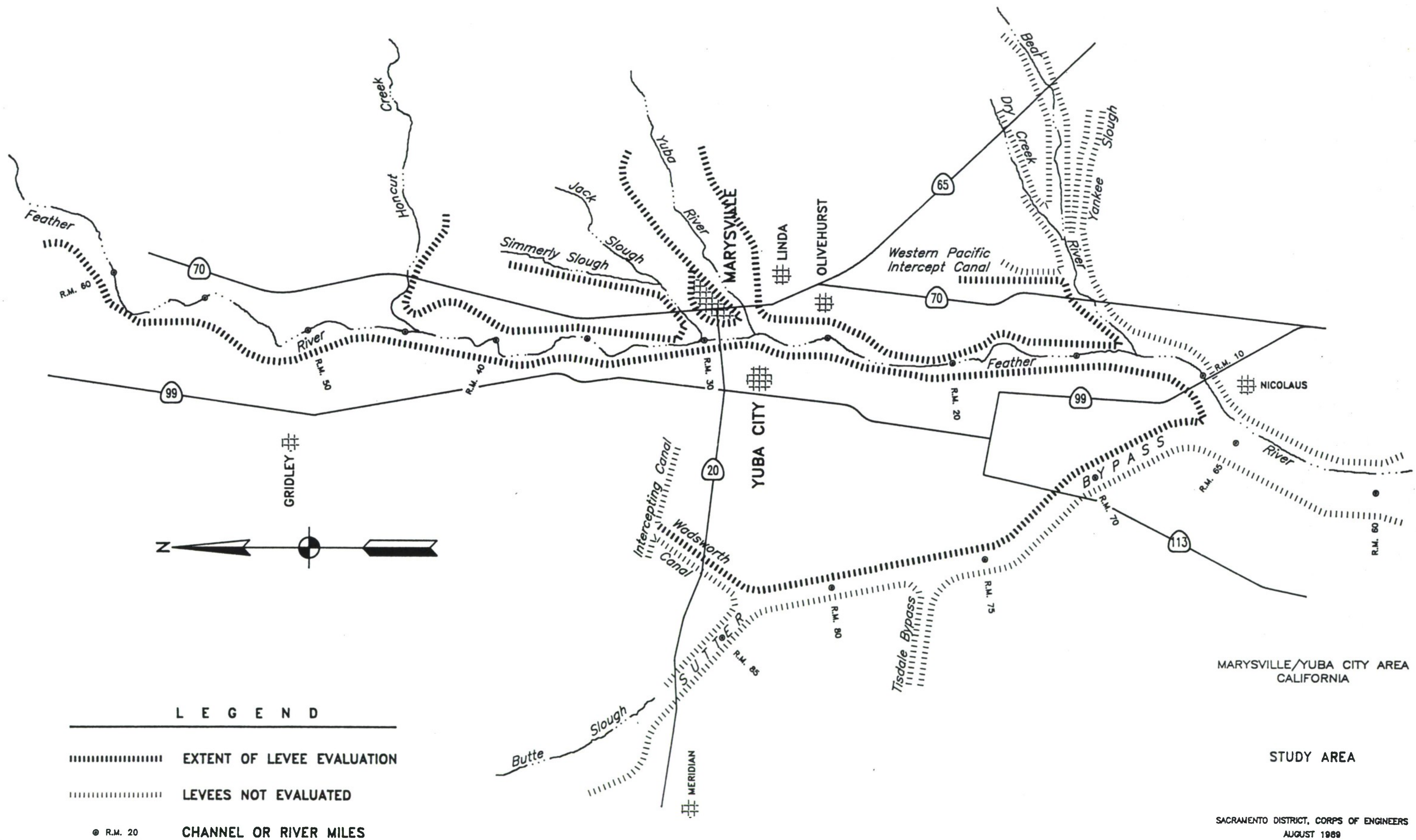
FLOOD CONTROL SYSTEM EVALUATION

PHASES I-V

SACRAMENTO DISTRICT, CORPS OF ENGINEERS

JANUARY 1991

PLATE 2

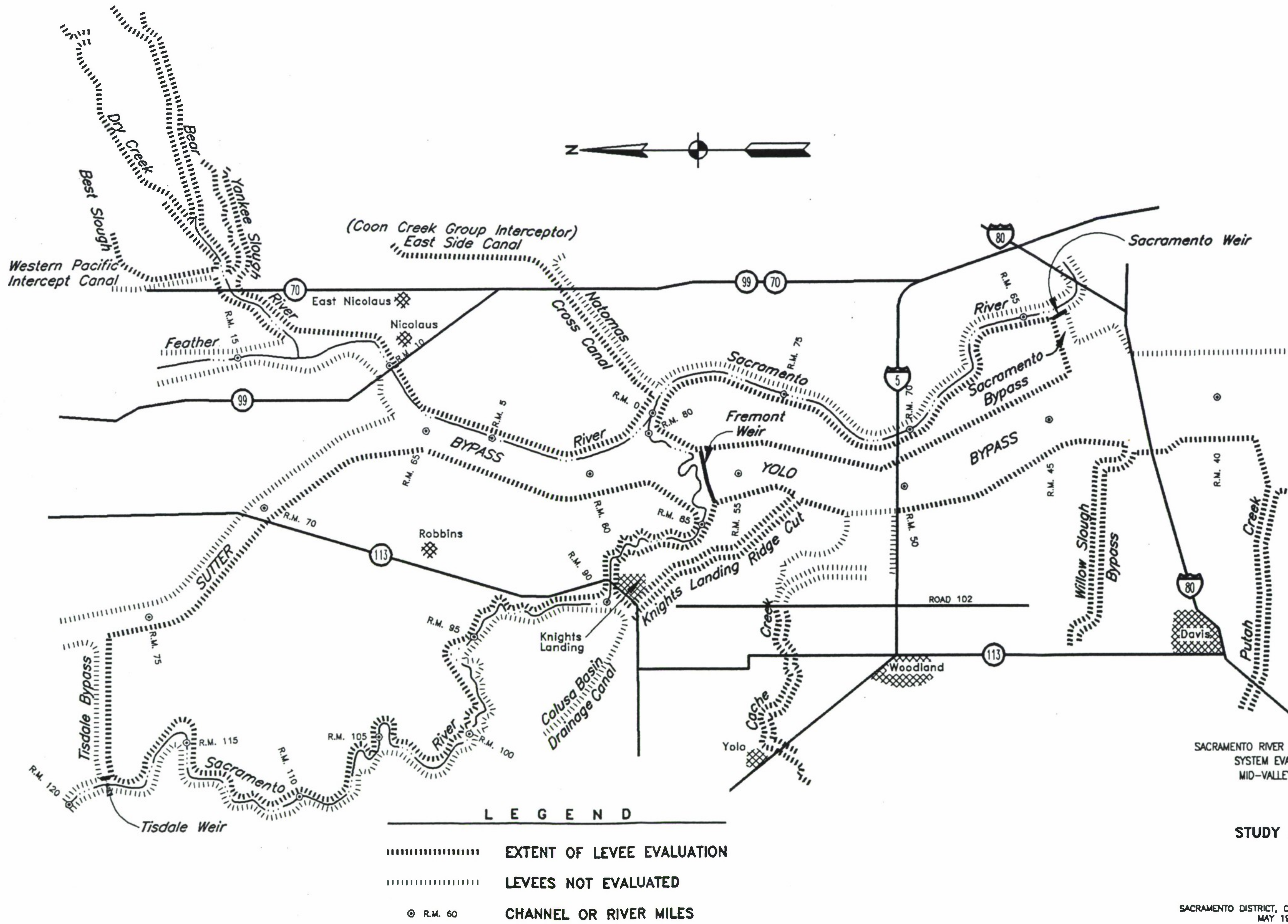


MARYSVILLE/YUBA CITY AREA
CALIFORNIA

STUDY AREA

SACRAMENTO DISTRICT, CORPS OF ENGINEERS
AUGUST 1989

PLATE 3

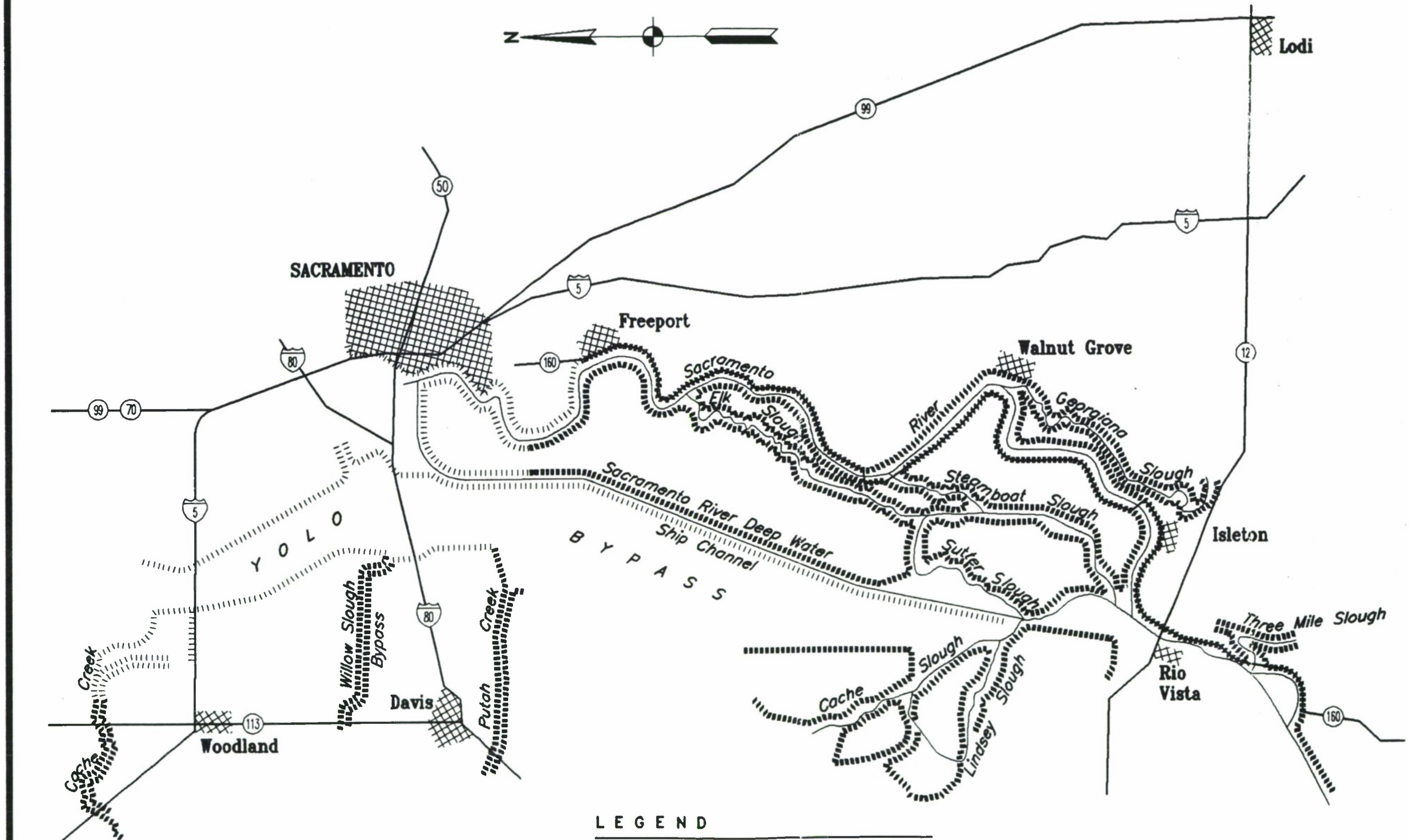


SACRAMENTO RIVER FLOOD CONTROL
SYSTEM EVALUATION
MID-VALLEY AREA

STUDY AREA

SACRAMENTO DISTRICT, CORPS OF ENGINEERS
MAY 1990

PLATE 4



L E G E N D

EXTENT OF LEVEE EVALUATION

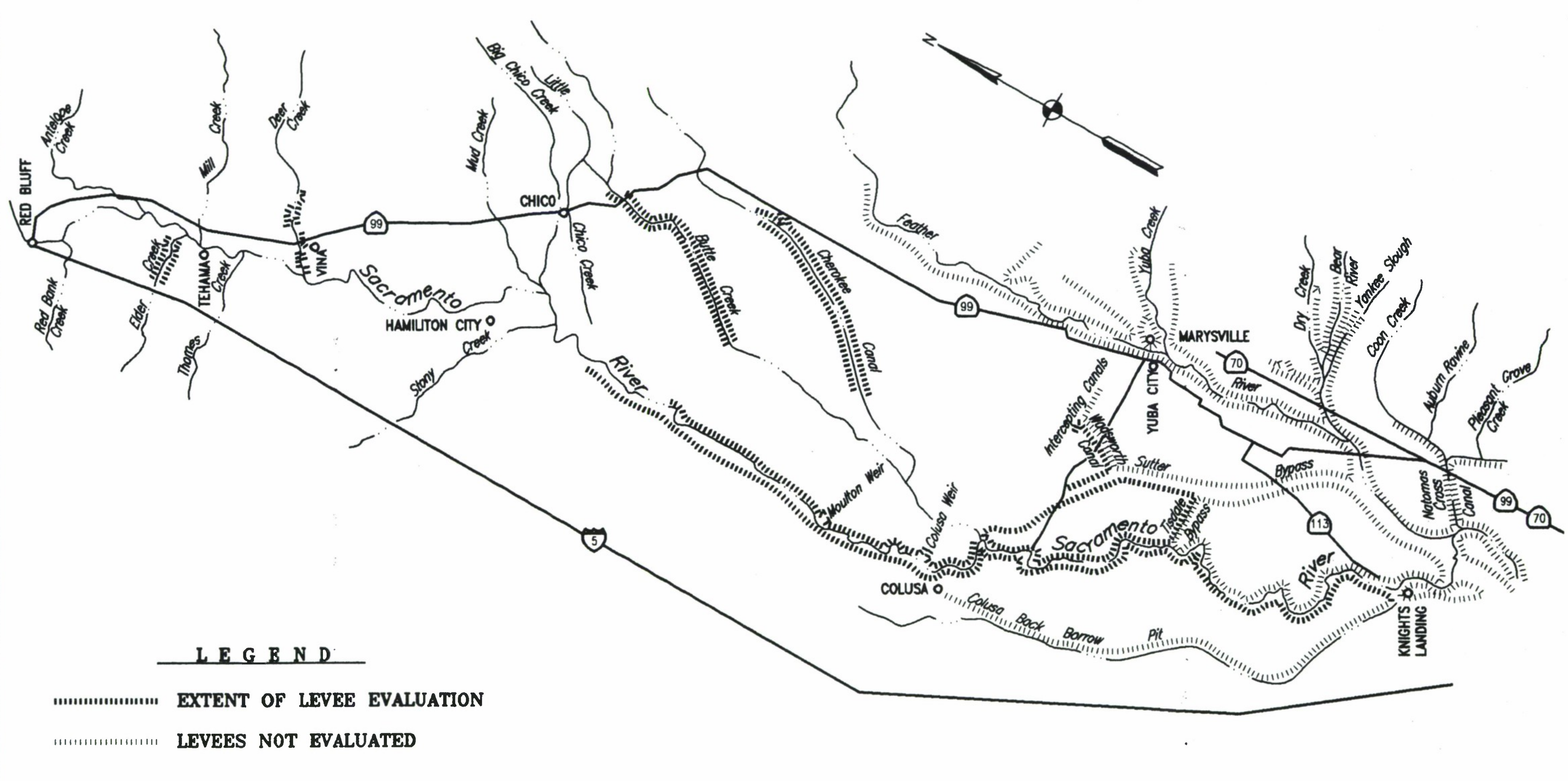
LEVEES NOT EVALUATED

SACRAMENTO RIVER FLOOD CONTROL
SYSTEM EVALUATION
LOWER SACRAMENTO AREA

STUDY AREA

SACRAMENTO DISTRICT, CORPS OF ENGINEERS
AUGUST 1990

PLATE 5

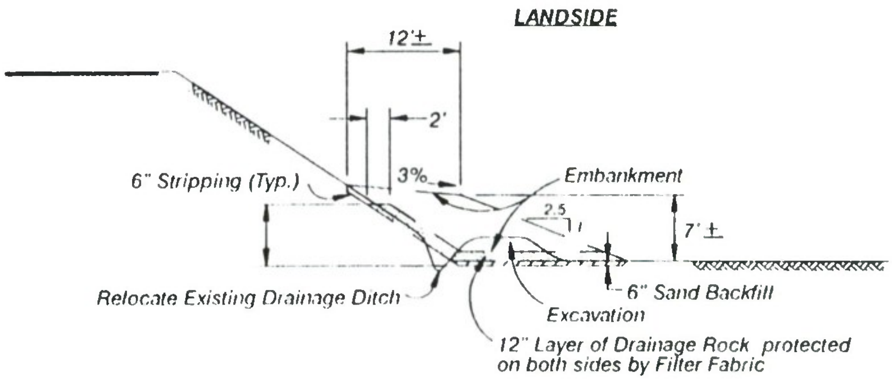


SACRAMENTO RIVER FLOOD CONTROL
SYSTEM EVALUATION
UPPER SACRAMENTO AREA

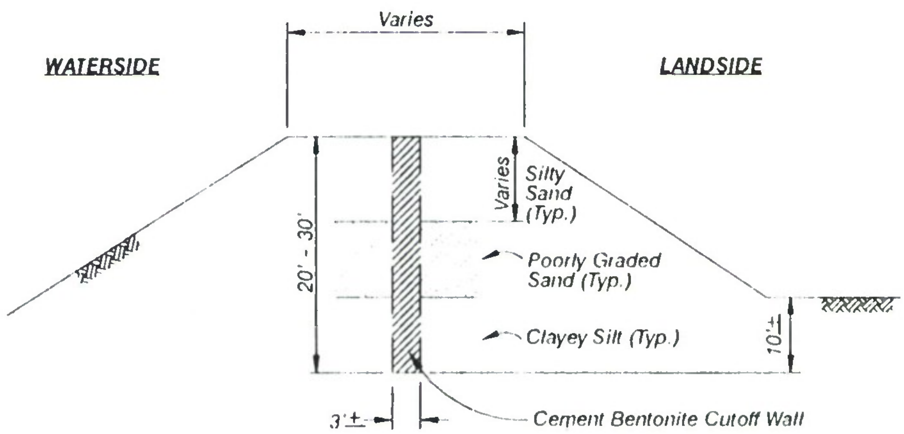
STUDY AREA

SACRAMENTO DISTRICT, CORPS OF ENGINEERS
MARCH 1991

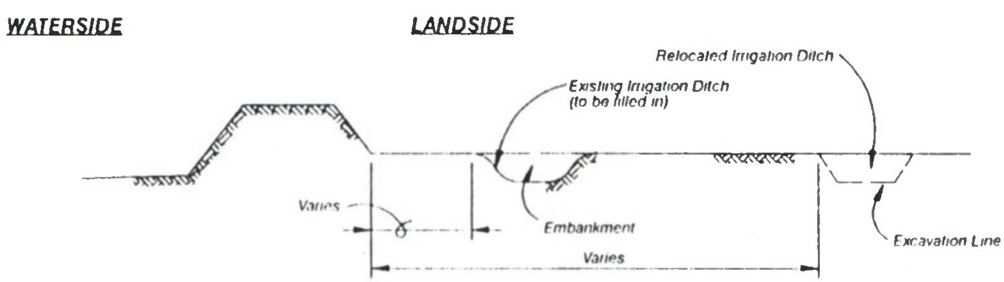
PLATE 6



A. Construction of a Stability Berm



B. Construction of a Cutoff Wall



C. Relocation of Irrigation Ditch

Plate 7

APPENDIX A

404(b)(1) WATER QUALITY EVALUATION
SACRAMENTO RIVER FLOOD CONTROL SYSTEM EVALUATION, PHASES II-V

SECTION I

Introduction

Alternative plans for reconstruction work on the Sacramento River Flood Control Project levees in the Sacramento River Flood Control System could involve relocating existing irrigation ditches along landward toes of the project levees or result in the placement of fill materials into the waters of the United States or their associated wetlands.

In accordance with Section 404(b)(1) of the Clean Water Act (33 USC 1344), and other pertinent laws and regulations, the placement of fill material below ordinary high water into the waters of the United States or their associated wetlands requires an evaluation of water quality considerations associated with the project. This evaluation was prepared to accompany the programmatic Environmental Impact Statement/Environmental Impact Report for the overall system evaluation. A detailed 404(b)(1) water quality evaluation will also be prepared for each phase of the project. The 404(b)(1) evaluation will be submitted with the detailed environmental evaluation of the impacts of proposed reconstruction work at specific sites. The specific evaluation is used to qualify the project for an exemption or certification from the State of California in accordance with Section 404(r) of the Clean Water Act. A wetlands delineation will be conducted by the Corps' Regulatory Functions Branch for each phase of the project.

SECTION II

1. Project Location. The project is located along the Sacramento River and tributaries in the Central Valley of northern California (see Attachment 1). The project area includes parts of 10 counties: Butte, Colusa, Contra Costa, Glenn, San Joaquin, Solano, Sutter, Tehama, Yolo and Yuba. The project is a part of the Sacramento River Flood Control Project.

2. General Description. As a result of geotechnical investigations following the 1986 flood event, it was determined that numerous segments of levees within the project area are not functioning at their design level. Structural repairs to reconstruct these levees are being developed and will be proposed for each phase. The five potential methods of structural repair are briefly described below:

A. Construct drainage improvements at or near the landward toe of the levee embankment. This alternative would consist of

constructing drainage improvements at or near the landward toe of the existing levee embankment. The drainage improvements would require clearing, excavating and constructing gravel drains, probably within 10 feet of the landward toe of the existing levee embankment. Excess drainage water would be collected and pumped back into the river system or conveyed to existing drainage facilities. Also, excess water could be allowed to flow overland to collector ditches.

B. Raise levees. This alternative would consist of raising the existing levee embankment in those levee reaches that do not have the minimum required design freeboard above the design water surface elevation. Levee raising would primarily involve widening the levee embankment to the landward side. Levee raising could result in extending the landward side of the levee up to 30 feet.

C. Raise levees and construct drainage improvements at or near the landward toe of the levee embankment. This alternative would a combination of A and B.

D. Construct a cutoff wall. Construction of a cutoff wall entails digging a trench down the middle, or near the middle, of the existing levee embankment and filling it with an impervious material (see Attachment 2). This creates a barrier to the movement of water through the levee and foundation and prevents piping of the levee or foundation material.

E. Construct drainage improvements and stabilizing berm at landside levee toe. This alternative would include clearing and grubbing the lower half of the landward levee slope and placing drain rock over the lower slope. The drain material would be covered and a berm, approximately 10 to 50 feet wide and 5 to 15 feet high, would then be constructed. Installation of the drain rock serves to strengthen the levee by permitting the drainage of water, while retarding the loss of levee material. The combination of the berm with the drain rock adds strength to the levee embankment and permits drainage of seepage waters to prevent piping of soil materials. The addition of the berm also acts to prevent levee sloughing. This alternative also includes relocating any irrigation ditches that are adjacent to the landside levee toe.

Alternatives A, B, C and E are considered in this evaluation. Alternative D will not be considered because it would not require the relocation of any irrigation ditches, or result in the placement of fill material into the waters of the United States or their associated wetlands. Any disposal material would be placed in areas away from water or wetlands.

3. Authorization. The Sacramento River Flood Control Project was originally authorized by the Flood Control Act of 1917. The evaluation of the Sacramento River Flood Control System was

authorized and funded as part of the Energy and Water Development Appropriation Act of 1987 (Public Law 99-591).

SECTION III
FACTUAL DETERMINATIONS

1. Physical Substrate Determinations.

a. Is the dredged or fill material similar to the material at the sites where it would be placed? The material that would be used to fill existing irrigation ditches would be taken from the sites of the replacement ditches. This material is the same type and composition as that found at the existing ditches. Material used during construction of Alternatives B, C or E would be taken from approved borrow sites near the construction sites. The material would be similar to that at the sites and certified as being free of contaminants.

b. Would there be any significant effects in the surrounding area (erosion or lateral displacement) as a result of changes in bottom elevation or contours? The new irrigation ditches would be constructed at a similar slope and bottom elevation. The material used to fill the existing ditches would not result in the displacement of materials into other wetland areas nearby. (This newly placed material would be stabilized by seeding with grasses.) Material placed during construction of Alternative B, C or E would be stabilized to prevent surface erosion into any wetland areas.

c. Would the dredged or fill material stay in the area where it would be placed? The fill material would be placed next to the existing levees in order to form a berm. These berms would be seeded with grasses to reduce erosion. The material would not enter any water body or wetland area.

d. Is the site where the material would be placed confined to the smallest practicable area? Fill would be placed only where needed to construct the berms, or to fill the existing irrigation ditches.

e. Are any actions proposed which would minimize adverse effects on the physical substrate? The new irrigation ditches would be constructed prior to filling the existing irrigation ditches. Water in the existing irrigation ditches would be rerouted into the new irrigation ditches before placing fill in the existing ditches.

2. Water Circulation, Fluctuation and Salinity Determinations.

a. Would the discharge significantly affect current patterns, circulation, and normal water fluctuations? After

completion of reconstruction work and relocation of the irrigation ditches, they would function as they currently do under the pre-project conditions.

b. Would the discharge significantly affect salinity? Relocation of the irrigation ditches would not affect salinity.

c. Would the discharge divert or obstruct flow? No. New irrigation ditches would be constructed and water diverted through them before the existing ditches are filled.

d. Would the discharge activities destroy or isolate flood plain areas that serve the function of retaining natural highwaters or floodwaters? No. Irrigation ditches are located adjacent to levees and do not act as flood plain areas.

e. Are there any actions proposed that would minimize adverse effects on circulation, fluctuation, or salinity? None are necessary.

3. Suspended Particulates/Turbidity.

a. Would the discharge result in unacceptable levels of turbidity? No. Water would be rerouted through the new irrigation ditches before the existing ditches are filled.

b. Are any actions proposed that would serve to reduce the turbidity? None are necessary.

4. Contaminants.

a. Would the discharge result in the introduction of contaminants or other materials that would adversely affect water quality? No. Fill would be placed in the existing irrigation ditches after they have been de-watered. The fill material would be obtained from nearby areas that are free of pollutants or contaminants.

b. Are any measures proposed that would serve to avoid the introduction of contaminants into the waterway? All fill material would be from clean sources. Most work would be done on the landside of the levee, reducing the likelihood that contaminants would be introduced into any waterway.

5. Aquatic Ecosystem and Organism Determination.

a. Would the discharge jeopardize the existence or modify the habitat of a threatened or endangered species? No. The giant garter snake, a State-listed threatened species, is known to occur in some parts of the area. The irrigation ditches represent potential habitat for this species. The irrigation ditches would

be inspected by DFG and if mitigation is necessary would be implemented according to their direction.

If the giant garter snake is present (or potentially present), then the following mitigation measures would be taken. Relocation of the irrigation drainage ditches would be timed to occur between May and October, while the snake is active. New ditches would be established and water routed through them until October. During the winter the irrigation ditches would be allowed to dry. When dry, the old ditches would be prevented from refilling with water the following spring. The old ditches would be left unfilled until June and would be inspected by DFG before they are filled. Before construction begins at the new ditches, which may contain giant gartersnakes, DFG would inspect the areas. A 30-foot-wide strip, the hibernating zone, immediately along each bank of the old ditches would be left clear of any excavated material.

b. Would the discharge significantly disrupt the food chain including alteration or decrease in diversity of plant and animal species? There would be a temporary loss in the food chain while the new irrigation ditches become established. This would not be a long-term significant impact, and there would be no expected decrease in the diversity of plant and animal species.

c. Would the discharge significantly inhibit movement of animals, especially into and out of feeding, spawning, breeding and nursery areas? No. The replacement irrigation ditches would be constructed prior to filling the existing irrigation ditches. Any irrigation water would be routed through the new irrigation ditches, and they would be available as feeding, spawning, breeding or nursery areas. There may be short-term losses of habitat while vegetation becomes established in the new irrigation ditches.

d. Would the discharge significantly affect shellfish populations, benthic life, fisheries, spawning cycles, or nursery areas? No. There may be a short-term loss of habitat in the new irrigation ditches, but this habitat would become reestablished within a year.

e. Would the project have an adverse impact on wetlands? The project would have a short-term adverse impact on wetlands. In order to construct the project, several irrigation ditches may have to be relocated. Construction of the stability berms (and relocation of associated irrigation ditches) would be determined to be the least damaging practicable alternative. Fill would be confined to the smallest practicable area. The newly constructed irrigation ditches would replace aquatic values associated with the existing irrigation ditches within a few growing seasons. Also, additional acres of emergent marsh and open water mitigation could be provided for project impacts at nearby sites.

f. Would the disposal have a significant impact on vegetated shallows? No. As described in paragraph 5e, the irrigation ditches would be relocated and vegetation would become reestablished within a few growing seasons.

g. Would the discharge significantly affect any riffle and pool complexes? No. There are no riffle and pool complexes in the project area.

h. If the discharge involves wetlands, vegetated shallows, or riffle and pool complexes, would the work require direct access or proximity to the water resources in order to fulfill its basic purpose? The basic purpose of the project is to provide structural repairs to the levees of the Sacramento River Flood Control Project. In order to accomplish this, it may be necessary to relocate existing drainage ditches, which would result in minor short-term impacts as described above.

i. Would the discharge violate water quality or effluent standards? No water quality or effluent standards would be violated either during or after the construction periods.

j. Are any measures proposed that would reduce or avoid significant impacts on the aquatic ecosystem? As described in 5a, new irrigation ditches would be constructed before the existing ditches are filled, and water would be rerouted through the new irrigation ditch.

6. Proposed Disposal Site Determination.

a. Would the discharge have a significant effect on municipal water supply intakes? No. There are no municipal water supply intakes located along the irrigation ditches.

b. Would the discharge significantly degrade esthetic, recreational, or economic values? The construction phases of the project would result in short-term increases in noise and dust in the project areas. By rehabilitating the project levees, the proposed project would have a significant positive value for property owners and residents in the project area.

c. Is the proposed discharge site the least environmentally damaging practicable alternative? Yes. This would be the least environmentally damaging plan that provides for reconstruction of project levees.

d. Are any actions proposed which would avoid significant effects as a result of disposal? None are necessary.

7. Cumulative Effects Determination. Most effects described in this evaluation would be temporary, minor, or within acceptable limits. The loss of any riparian woodland would be mitigated in

accordance with agreements between the Corps, The Reclamation Board, DFG, and the Fish and Wildlife Service.

8. Secondary Effects on the Aquatic Ecosystems Determination.

a. Would the disposal result in fluctuations of water elevations or modification of streamflows? No. All irrigation flows would be rerouted through the new irrigation ditches before existing ditches are filled.

b. Would the discharge result in significantly increased surface runoff or leaching or undesirable wastes associated with residential or commercial development? No increased surface runoff or undesirable wastes would result from the proposed project.

c. Are any measures proposed which would reduce or avoid secondary effects, on the aquatic ecosystem? None are necessary.

Sacramento District
Corps of Engineers

APPENDIX B

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Endangered Species Office
2800 Cottage Way, Room E-1823
Sacramento, California 95825-1846

In Reply Refer To:
1-1-89-SP-598

May 11, 1989

Walter Yep
Department of the Army
Sacramento District Corps of Engineers
Environmental Resources Branch
650 Capitol Mall
Sacramento, California 95814-4794

Subject: Species List for the Proposed Sacramento River Flood Control Systems Evaluation, Phase II, California

Dear Mr. Yep:

As requested by letter from your agency dated April 6, 1989, you will find attached a list of the listed endangered and threatened species that may be present in the subject project area. (See Attachment A.) To the best of our knowledge, no proposed species occur within the area. This list fulfills the requirement of the Fish and Wildlife Service to provide a species list pursuant to Section 7(c) of the Endangered Species Act, as amended.

Some pertinent information concerning the distribution, life history, habitat requirements, and published references for the listed species is also attached. This information may be helpful in preparing the biological assessment for this project, if one is required. Please see Attachment B for a discussion of the responsibilities Federal agencies have under Section 7(c) of the Act and the conditions under which a biological assessment must be prepared by the lead Federal agency or its designated non-Federal representative.

Formal consultation, pursuant to 50 CFR § 402.14, should be initiated if you determine that a listed species may be affected by the proposed project. Informal consultation may be utilized prior to a written request for formal consultation to exchange information and resolve conflicts with respect to a listed species. If a biological assessment is required, and it is not initiated within 90 days of your receipt of this letter, you should informally verify the accuracy of this list with our office.

Also, for your consideration, we have included a list of the candidate species that may be present in the project area. (See Attachment A.) These species are currently being reviewed by our Service and are under consideration for possible listing as endangered or threatened. Candidate species have no protection under the Endangered Species Act, but are included for your consideration as it is possible that one or more of these candidates could be proposed and listed before the subject project is completed. Should the

biological assessment reveal that candidate species may be adversely affected, you may wish to contact our office for technical assistance. One of the potential benefits from such technical assistance is that by exploring alternatives early in the planning process, it may be possible to avoid conflicts that could otherwise develop, should a candidate species become listed before the project is completed.

Please contact Peggie Kohl at 916/978-4866 (FTS 460-4866) if you have any questions regarding the attached list or your responsibilities under the Endangered Species Act.

Sincerely,

David C. Harlow

for Gail C. Kobetich
Field Supervisor

Attachments

ATTACHMENT A

LISTED ENDANGERED AND THREATENED SPECIES AND CANDIDATE SPECIES THAT MAY OCCUR IN THE AREA OF THE PROPOSED SACRAMENTO RIVER FLOOD CONTROL SYSTEMS EVALUATION, PHASE II, CALIFORNIA (1-1-89-SP-598)

Listed Species

Invertebrates

valley elderberry longhorn beetle, *Desmocerus californicus dimorphus* (T)

Birds
American peregrine falcon (E)
bald eagle (E)

Fish
winter-run salmon (T)

Candidate Species

Birds

tricolored blackbird, *Agelaius tricolor* (2)
white-faced ibis, *Plegadis chihi* (2)

Amphibians

California red-legged frog, *Rana aurora draytoni* (2)

Invertebrates

Sacramento Valley tiger beetle, *Cicindela hirticollis abrupta* (2R)
Sacramento anthicid beetle, *Anthicus sacramento* (2)

Reptiles
giant garter snake (

Plants

California hibiscus, *Hibiscus californicus* (2)

(E)--Endangered (T)--Threatened (CH)--Critical Habitat
(1)--Category 1: Taxa for which the Fish and Wildlife Service has sufficient biological information to support a proposal to list as endangered or threatened.
(2)--Category 2: Taxa for which existing information indicated may warrant listing, but for which substantial biological information to support a proposed rule is lacking.
(2R)-Recommended for Category 2 status.

ATTACHMENT B

FEDERAL AGENCIES' RESPONSIBILITIES UNDER
SECTIONS 7(a) and (c) OF THE ENDANGERED SPECIES ACT

SECTION 7(a) Consultation/Conference

Requires: 1) Federal agencies to utilize their authorities to carry out programs to conserve endangered and threatened species; 2) Consultation with FWS when a Federal action may affect a listed endangered or threatened species to insure that any action authorized, funded or carried out by a Federal agency is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. The process is initiated by the Federal agency after determining the action may affect a listed species; and 3) Conference with FWS when a Federal action is likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed critical habitat.

SECTION 7(c) Biological Assessment--Major Construction Activity[1]

Requires Federal agencies or their designees to prepare a Biological Assessment (BA) for major construction activities. The BA analyzes the effects of the action[2] on listed and proposed species. The process begins with a Federal agency requesting from FWS a list of proposed and listed threatened and endangered species. The BA should be completed within 180 days after its initiation (or within such a time period as is mutually agreeable). If the BA is not initiated within 90 days of receipt of the list, the accuracy of the species list should be informally verified with our Service. No irreversible commitment of resources is to be made during the BA process which would foreclose reasonable and prudent alternatives to protect endangered species. Planning, design, and administrative actions may proceed; however, no construction may begin.

We recommend the following for inclusion in the BA: an on-site inspection of the area affected by the proposal which may include a detailed survey of the area to determine if the species or suitable habitat are present; a review of literature and scientific data to determine species' distribution, habitat needs, and other biological requirements; interviews with experts, including those within FWS, State conservation departments, universities and others who may have data not yet published in scientific literature; an analysis of the effects of the proposal on the species in terms of individuals and populations, including consideration of indirect effects of the proposal on the species and its habitat; an analysis of alternative actions considered. The BA should document the results, including a discussion of study methods used, any problems encountered, and other relevant information. The BA should conclude whether or not a listed or proposed species will be affected. Upon completion, the BA should be forwarded to our office.

---

[1] A construction project (or other undertaking having similar physical impacts) which is a major Federal action significantly affecting the quality of the human environment as referred to in NEPA (42 U.S.C. 4332(2)C).

[2] "Effects of the action" refers to the direct and indirect effects on an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action.

VALLEY ELDERBERRY LONGHORN BEETLE
(*Desmocerus californicus dimorphus*)

CLASSIFICATION: Threatened - Federal Register 45:FR52803 August 8, 1980.

CRITICAL HABITAT: Federal Register 17.95(c), May 7, 1980.

California. Sacramento County.

(1) Sacramento Zone. An area in the city of Sacramento enclosed on the north by the Route 160 Freeway, on the west and southwest by the Western Pacific railroad tracks, and on the east by Commerce Circle and its extension southward to the railroad tracks.

(2) American River Parkway Zone. An area of the American River Parkway on the south bank of the American River, bounded on the north by latitude 38 37'30" N, and on the South and east by Ambassador Drive and its extension north to latitude 38 37'30" N, Goethe Park, and that portion of the American River Parkway northeast of Goethe Park, west of the Jedediah Smith Memorial Bicycle Trail, and north to a line extended eastward from Palm Drive.

(3) Putah Creek Zone. California. Solano County. R 2 W T. 8 N. Solano County portion of Section 26.

DESCRIPTION:

Horn described the valley elderberry longhorn beetle in 1881 and it was redescribed in 1921 by Fisher. Morphological description: In general, longhorn beetles are characterized by somewhat elongate and cylindrical bodies with long antennae, often in excess of 2/3 of the body length. In contrast, males of VELB are stout-bodied and their elytra (thickened, hardened forewings) are coarsely punctured, with a metallic-green pattern of 4 oblong maculations, surrounded by a bright red- orange border. The border eventually fades to yellow on museum specimens. The maculations are fused on some males, more closely resembling the nominate subspecies. Antennae are about as long as the body or slightly shorter. Body length is about 13-21 mm.

Females are more robust, elytra are subparallel, and the dark pattern is not reduced. Antennae reach to about the middle of the elytra and body length is about 18-25 mm. Both sexes of VELB are readily identified due to their distinctive appearance. As noted earlier, males with fused maculations resemble the nominate subspecies, *Desmocerus californicus dimorphus*, Fisher, 1921.

DISTRIBUTION:

VELB is endemic to moist valley oak woodlands along the margins of rivers and streams in the lower Sacramento and upper San Joaquin Valley of California, where elderberry (*Sambucus* spp.), its foodplant, grows. During the past 150 years over 90

percent of the riparian habitat in California has been destroyed by agricultural and urban development. Although the entire historical distribution of VELB is unknown, the extensive destruction or riparian forests of the Central Valley of California strongly suggests that the beetle's range may have shrunk and become greatly fragmented.

Due to the limited knowledge about the VELB's life history, and its ecological requirements, precise threats to its survival are difficult to enumerate. Clearly the primary threat to survival of the VELB has been and continues to be loss and alteration of habitat by agricultural conversion, grazing, levee construction, stream and river channelization, removal of riparian vegetation, rip-rapping of shoreline, plus recreational, industrial and urban development. Insecticide and herbicide use in agricultural areas may be factors limiting the beetle's distribution. The age and quality of individual elderberry shrubs/trees and stands as a foodplant for VELB may also be a factor in the beetle's limited distribution.

There is little information on former abundance of VELB for comparison with current population levels. A. T. McClay collected 51 adults during May 1947. Dr. John A. Chemsak, a cerambycid specialist from the University of California, Berkeley, believes that VELB has probably always been rather rare and of limited abundance.

SPECIAL CONSIDERATION:

The riparian habitat of the beetle is still being degraded by urban development and levee repair work along the rivers. There has been some successful elderberry transplantings in specific areas along the rivers. This has increased the viable habitat for the beetle.

Special recovery efforts needed: Protect the only known VELB colonies; conduct further research on life history and habitat requirements of VELB; survey areas in Central Valley of California to locate additional colonies; formulate management plans as appropriate information on VELB's biology becomes available; establish VELB at rehabilitated habitat sites within present-day range; monitor VELB colonies to determine population status and success of management actions as implemented; increase public awareness of VELB through educational and information programs. Studies on the physiological requirements of the beetle and of the elderberry plants are needed.

REFERENCES FOR ADDITIONAL INFORMATION:

Arnold, R. A. 1984. Interim report for contract C-616 with the California Department of Fish and Game. 14 pp.

Burke, H.E. 1921. Biological notes on *Desmocerus*, a genus of roundhead borers, the species of which infests various elders. J. Econ. Ent. 14:450-452.

Craighead, F.C. 1923. North American cerambycid larvae. A clarification and the biology of North American cerambycid larvae. Can. Dept. Ag., Ottawa. Bull. 27. 239 pp.

Eng, L.L. 1984. Rare, threatened, and endangered invertebrates in California riparian systems. Pp. 915-919, in R. E. Warner and K. M. Hendrix (eds). California Riparian Systems: Ecology, Conservation, and Productive Management. University of California Press, Berkeley. 1035 pp.

Eya, B.K. 1976. Distribution and status of a longhorn beetle, *Desmocerus californicus dimorphus* Fisher (Coleoptera: Cerambycidae). Unpublished ms. 6 pp.

Jones and Stokes. 1985 and 1986. Survey of habitat and population of the valley elderberry longhorn beetle along the Sacramento River, 1985 Progress Report. 46 pp., A 1 and 2 86 pp.

Linsley, E. G., and J. A. Chemsak. 1972. Cerambycidae of North America, part No. 1. Taxonomy and classification of the sub-family Lepturinae. University of California publ. Entomol. Vol. 69.

Western Ecological Services Company (WESCO). Undated. Lower San Joaquin River snagging and clearing project endangered species data report; valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*). Report submitted to U.S. Army Engineer District, Sacramento. Contract No. DACW05-84-P-1051. 15 pp.

U.S. Fish and Wildlife Service. 1984. Valley elderberry longhorn beetle recovery plan. U.S. Fish and Wildlife Service, Portland, Oregon. 62 pp.

CONVERSATION RECORD

TIME: 2:00

DATE: March 19, 1990

TYPE: [x] VISIT ☐ CONFERENCE ☐ TELEPHONE ☐ INCOMING ☐ OUTGOING

Location of Visit/Conference:

ROUTING	
NAME/SYMBOL	INT
Plng Div	
ERB	
C-V Sect.	

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU: Peggy Kohl

ORGANIZATION (Office, dept., bureau, etc.): FWS

TELEPHONE NO: 978-4866

SUBJECT: Sac Systems Evaluation, Phase II - Informal Endangered Species Coordination.

SUMMARY

I spoke with Peggy Kohl to verify the accuracy of the species list received for Phase II of this project in 1989. Peggy said that based on the list that FWS provided for Phases II-V in 1990 we should also include the following species: winter-run salmon, American peregrine falcon, bald eagle, and the giant garter snake.

ACTION REQUIRED

None

NAME OF PERSON DOCUMENTING CONVERSATION: Patricia Roberson

SIGNATURE: Patricia Roberson

DATE: 3/19/90

ACTION TAKEN

SIGNATURE

TITLE

DATE

50271-101 *U.S. GOVERNMENT PRINTING OFFICE: 1988-220-931 CONVERSATION RECORD

OPTIONAL FORM 271 (12-76) DEPARTMENT OF DEFENSE

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Fish and Wildlife Enhancement
Sacramento Endangered Species Office
2800 Cottage Way, Room E-1823
Sacramento, California 95825-1846

In Reply Refer To:
1-1-90-SP-309

February 13, 1990

Walter Yep
Department of the Army
Sacramento District
Corps of Engineers
Attn: Environmental Resources Branch
650 Capitol Mall
Sacramento, California 95814-4794

Subject: Species List for the Proposed Sacramento Flood Control Project Levees Ivenstigation, Sacramento County, California

Dear Mr. Yep:

As requested by letter from your agency dated January 17, 1989, you will find attached a list of the listed endangered and threatened species that may be present in the subject project area. (See Attachment A.) To the best of our knowledge, no proposed species occur within the area. This list fulfills the requirement of the Fish and Wildlife Service to provide a species list pursuant to Section 7(c) of the Endangered Species Act, as amended.

Some pertinent information concerning the distribution, life history, habitat requirements, and published references for the listed species is also attached. This information may be helpful in preparing the biological assessment for this project, if one is required. Please see Attachment B for a discussion of the responsibilities Federal agencies have under Section 7(c) of the Act and the conditions under which a biological assessment must be prepared by the lead Federal agency or its designated non-Federal representative.

Formal consultation, pursuant to 50 CFR § 402.14, should be initiated if you determine that a listed species may be affected by the proposed project. Informal consultation may be utilized prior to a written request for formal consultation to exchange information and resolve conflicts with respect to a listed species. If a biological assessment is required, and it is not initiated within 90 days of your receipt of this letter, you should informally verify the accuracy of this list with our office.

Also, for your consideration, we have included a list of the candidate species that may be present in the project area. (See Attachment A.) These species are currently being reviewed by our Service and are under consideration for possible listing as endangered or threatened. Candidate species have no protection under the Endangered Species Act, but are included for your consideration as it is possible that one or more of these candidates could be

proposed and listed before the subject project is completed. Should the biological assessment reveal that candidate species may be adversely affected, you may wish to contact our office for technical assistance. One of the potential benefits from such technical assistance is that by exploring alternatives early in the planning process, it may be possible to avoid conflicts that could otherwise develop, should a candidate species become listed before the project is completed.

Please contact Peggie Kohl at 916/978-4866 (FTS 460-4866) if you have any questions regarding the attached list or your responsibilities under the Endangered Species Act.

Sincerely,

James J. McKevitt

for Wayne S. White
Field Supervisor

Attachments

ATTACHMENT A

LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES AND CANDIDATE SPECIES THAT MAY OCCUR IN THE AREA OF THE PROPOSED SACRAMENTO FLOOD CONTROL PROJECT LEVEES INVESTIGATION
SACRAMENTO COUNTY, CALIFORNIA
1-1-90-SP-309

Listed Species

Birds
- bald eagle, *Haliaeetus leucocephalus* (E)
- American peregrine falcon, *Falco peregrinus anatum* (E)

Fish
- winter-run chinook salmon, *Oncorhynchus tshawytscha* (T)

Invertebrates
- valley elderberry longhorn beetle, *Desmocerus californicus dimorphus* (T)

Plants
- palmate-bracted bird's beak, *Cordylanthus palmatus* (E)

Candidate Species

Birds
- ferruginous hawk, *Buteo regalis* (2)

Fish
- Sacramento splittail, *Pogonichthys macrolepidotus* (2)
- delta smelt, *Hypomesus transpacificus* (1)

Mammals
- San Joaquin pocket mouse, *Perognathus inornatus* (2)
- San Joaquin valley woodrat, *Neotoma fuscipes riparia* (2)

Amphibians
- California tiger salamander, *Ambystoma tigrinum californiense* (2)
- √California red-legged frog, *Rana aurora draytonia* (2)

Reptiles
- √giant garter snake, *Thamnophis couchi gigas* (2)

Invertebrates
- √Sacramento Valley tiger beetle, *Cicindela hiricollis gravida* (2R)
- √Sacramento anthicid beetle, *Anthicus sacramento* (2)

Plants

Suisun aster, *Aster chilensis* var. *lentus* (2)
heart-scale, *Atriplex cordulata* (2R)
California hibiscus, *Hibiscus californicus* (2)
delta tule-pea, *Lathyrus jepsonii* ssp. *jepsonii* (2)
Mason's lilaeopsis, *Lilaeopsis masonii* (2)
little mousetail, *Myosurus minimus* ssp. *apus* (2)
Colusa grass, *Neostapfia colusana* (2)

(E)--Endangered (T)--Threatened (CH)--Critical Habitat
(1)--Category 1: Taxa for which the Fish and Wildlife Service has sufficient biological information to support a proposal to list as endangered or threatened.
(2)--Category 2: Taxa for which existing information indicated may warrant listing, but for which substantial biological information to support a proposed rule is lacking.
(2R)-Recommended for Category 2 status.

ATTACHMENT B

FEDERAL AGENCIES' RESPONSIBILITIES UNDER SECTIONS 7(a) and (c) OF THE ENDANGERED SPECIES ACT

SECTION 7(a) Consultation/Conference

Requires: 1) Federal agencies to utilize their authorities to carry out programs to conserve endangered and threatened species; 2) Consultation with FWS when a Federal action may affect a listed endangered or threatened species to insure that any action authorized, funded or carried out by a Federal agency is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. The process is initiated by the Federal agency after determining the action may affect a listed species; and 3) Conference with FWS when a Federal action is likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed critical habitat.

SECTION 7(c) Biological Assessment--Major Construction Activity[1]

Requires Federal agencies or their designees to prepare a Biological Assessment (BA) for major construction activities. The BA analyzes the effects of the action[2] on listed and proposed species. The process begins with a Federal agency requesting from FWS a list of proposed and listed threatened and endangered species. The BA should be completed within 180 days after its initiation (or within such a time period as is mutually agreeable). If the BA is not initiated within 90 days of receipt of the list, the accuracy of the species list should be informally verified with our Service. No irreversible commitment of resources is to be made during the BA process which would foreclose reasonable and prudent alternatives to protect endangered species. Planning, design, and administrative actions may proceed; however, no construction may begin.

We recommend the following for inclusion in the BA: an on-site inspection of the area affected by the proposal which may include a detailed survey of the area to determine if the species or suitable habitat are present; a review of literature and scientific data to determine species' distribution, habitat needs, and other biological requirements; interviews with experts, including those within FWS, State conservation departments, universities and others who may have data not yet published in scientific literature; an analysis of the effects of the proposal on the species in terms of individuals and populations, including consideration of indirect effects of the proposal on the species and its habitat; an analysis of alternative actions considered. The BA should document the results, including a discussion of study methods used, any problems encountered, and other relevant information. The BA should conclude whether or not a listed or proposed species will be affected. Upon completion, the BA should be forwarded to our office.

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[1] A construction project (or other undertaking having similar physical impacts) which is a major Federal action significantly affecting the quality of the human environment as referred to in NEPA (42 U.S.C. 4332(2)C).

[2] "Effects of the action" refers to the direct and indirect effects on an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action.

BALD EAGLE

(*Haliaeetus leucocephalus*)

CLASSIFICATION:

Endangered (Federal Register 43:633; February 14, 1978).

CRITICAL HABITAT: None designated.

DESCRIPTION:

Next to the California condor, the bald eagle is the largest bird In California with a wingspan measuring 6 to 7 feet. Adults are brownish black with a white head and tail and yellow bill. Immatures are variously brownish black.

DISTRIBUTION:

Bald eagles can and do occur virtually anywhere in California during migration. They nest near water bodies in the northern portion of the state and winter throughout the state wherever suitable prey resources are available.

SPECIAL CONSIDERATIONS:

Although some bald eagle populations began to decline in the 19th century due to human persecution and habitat loss, the drastic declines in reproduction experienced by most eagle populations occurred between 1947 and 1970. Research Indicated that certain organochlorine pesticides interfered with productivity, and other pesticides were responsible for direct mortalities. Most bald eagle populations are now stable or increasing in numbers.

REFERENCES FOR ADDITIONAL INFORMATION:

Detrich, P. J. 1986. The status and distribution of the bald eagle in California. M. S. Thesis. Chico State Univ., CA

Frenzel, R. W. 1984. Ecology and environmental contaminants of bald eagles in southcentral Oregon. Ph.D. Thesis. Oregon State Univ., Corvallis, OR.

Lehman, R. N., D. E. Craigee, P. L. Collins, and R. S. Griffen. 1980. An analysis of habitat requirements and site selection criteria for nesting bald eagles in California. Report by Wilderness Research Institute, Arcata, CA for U.S. Forest Service, Region 5, San Francisco, CA.

U.S. Fish and Wildlife Service. 1986. Recovery plan for the Pacific Bald Eagle. Portland, OR.

AMERICAN PEREGRINE FALCON
(Falco peregrinus anatum)

CLASSIFICATION:

Endangered 35 **Federal Register** 16047, October 13, 1970, and 49 **Federal Register** 10526, March 20, 1984.

CRITICAL HABITAT: Designated in Sonoma, Napa, and Lake Cos.

DESCRIPTION:

A medium-sized, swift flying bird of prey with pointed wings. Wingspan is 3 to 4 feet. Adults have slate gray backs with white underparts that are streaked or barred in black. They have distinctive white and black facial markings.

DISTRIBUTION:

Historically nested throughout North America from the boreal forest south into Mexico, wherever suitable nesting and foraging habitat occurred. Remnant breeding populations currently occur in California, Arizona, New Mexico, Utah, Texas, and Alaska. A few pairs nest in other states in the northeast and northwest.

SPECIAL CONSIDERATIONS:

The American peregrine falcon has suffered major population declines due principally to DDT contamination of their food chain. With the banning of DDT for use in the U.S. in 1972 and implementation of a management program, populations have for the most part stabilized. Unfortunately, pesticide data indicate that there has been a continued input of DDT into the local environments. Some nest sites are now protected from human disturbance. Poor quality eggs are taken from the wild for artificial incubation, and young are placed in nests after hatching from wild eggs taken into captivity or laid by captive parents.

REFERENCES FOR ADDITIONAL INFORMATION:

J. J. Hickey (ed). 1969. Peregrine falcon populations their biology and decline. Univ. of Wisconsin Press. Madison, WI.

Ratcliffe, D. 1980. The peregrine falcon. Buteo Books. Vermillion, SD.

U.S. Fish and Wildlife Service. 1982. Pacific Coast Recovery Plan for the American Peregrine Falcon. Portland, OR. 87 pp.

VALLEY ELDERBERRY LONGHORN BEETLE

(*Desmocerus californicus dimorphus*)

CLASSIFICATION: Threatened - Federal Register 45:FR52803 August 8, 1980.

CRITICAL HABITAT: Federal Register 17.95(c), May 7, 1980.

California. Sacramento County.

(1) Sacramento Zone. An area in the city of Sacramento enclosed on the north by the Route 160 Freeway, on the west and southwest by the Western Pacific railroad tracks, and on the east by Commerce Circle and its extension southward to the railroad tracks.

(2) American River Parkway Zone. An area of the American River Parkway on the south bank of the American River, bounded on the north by latitude 38 37'30" N, and on the South and east by Ambassador Drive and its extension north to latitude 38 37'30" N, Goethe Park, and that portion of the American River Parkway northeast of Goethe Park, west of the Jedediah Smith Memorial Bicycle Trail, and north to a line extended eastward from Palm Drive.

(3) Putah Creek Zone. California. Solano County. R 2 W T. 8 N. Solano County portion of Section 26.

DESCRIPTION:

Horn described the valley elderberry longhorn beetle in 1881 and it was redescribed in 1921 by Fisher. Morphological description: In general, longhorn beetles are characterized by somewhat elongate and cylindrical bodies with long antennae, often in excess of 2/3 of the body length. In contrast, males of VELB are stout-bodied and their elytra (thickened, hardened forewings) are coarsely punctured, with a metallic-green pattern of 4 oblong maculations, surrounded by a bright red- orange border. The border eventually fades to yellow on museum specimens. The maculations are fused on some males, more closely resembling the nominate subspecies. Antennae are about as long as the body or slightly shorter. Body length is about 13-21 mm.

Females are more robust, elytra are subparallel, and the dark pattern is not reduced. Antennae reach to about the middle of the elytra and body length is about 18-25 mm. Both sexes of VELB are readily identified due to their distinctive appearance. As noted earlier, males with fused maculations resemble the nominate subspecies, *Desmocerus californicus dimorphus*, Fisher, 1921.

DISTRIBUTION:

VELB is endemic to moist valley oak woodlands along the margins of rivers and streams in the lower Sacramento and upper San Joaquin Valley of California, where elderberry (*Sambucus* spp.), its foodplant, grows. During the past 150 years over 90

BLUNT-NOSED LEOPARD LIZARD
(*Gambelia silus*)

CLASSIFICATION: Endangered (32 **Federal Register** 4001)

CRITICAL HABITAT: None designated.

The Revised Blunt-nosed Leopard Lizard Recovery Plan targets acquisition of at least 30,000 acres of leopard lizard valley floor habitats and protection of adjacent foothill and plain areas known to contain leopard lizard populations. Several portions of the San Joaquin Valley have been identified for this protection effort, including areas near Firebaugh, Tupman, Buttonwillow, Earlimart, and Kern and Pixley National Wildlife Refuges. Adjacent foothill and plain areas include the Carrizo and Elkhorn Plains and portions of the Cuyama Valley.

DESCRIPTION:

The blunt-nosed leopard lizard is a large, robust, lizard. Adults range in body length from approximately 3 to 5 inches. Including tail length, an adult blunt-nosed leopard lizard may exceed 15 inches. The back, sides, and tail are prominently marked with dark spots and pale cross-bars on a grayish tan background. The belly and undersides of the legs and tail are whitish. During the breeding season, adults may develop orange-red markings along the sides, under the belly, or along the tail. The species often conspicuously basks along the edges of secondary dirt roads, open alkaline soil areas, or embankments.

DISTRIBUTION:

The blunt-nosed leopard lizard was historically distributed throughout the San Joaquin Valley and adjacent interior foothills and plains, extending from central Stanislaus County south to extreme northeastern Santa Barbara County. The area occupied by this species has been significantly reduced and fragmented by agricultural, urban, and other man-induced actions. Preferred habitat consists of open grassland, saltbush shrubland, and alkaline sink communities.

SPECIAL CONSIDERATIONS:

The blunt-nosed leopard lizard is designated as an "endangered" species by the State of California. As such, it is afforded protection under State law. State agencies are required to consult with the California Department of Fish and Game regarding any proposed actions which may affect this species or its habitat.

REFERENCES FOR ADDITIONAL INFORMATION:

Chesemore, D. L. 1980. Blunt-nosed leopard lizard inventory, final report. Report for contract YA-553-CT0-51. U.S. Dept. of Interior, Bureau of Land Management, Bakersfield, CA.

Eng, L.L. 1984. Rare, threatened, and endangered invertebrates in California riparian systems. Pp. 915-919, in R. E. Warner and K. M. Hendrix (eds). California Riparian Systems: Ecology, Conservation, and Productive Management. University of California Press, Berkeley. 1035 pp.

Eya, B.K. 1976. Distribution and status of a longhorn beetle, *Desmocerus californicus dimorphus* Fisher (Coleoptera: Cerambycidae). Unpublished ms. 6 pp.

Jones and Stokes. 1985 and 1986. Survey of habitat and population of the valley elderberry longhorn beetle along the Sacramento River, 1985 Progress Report. 46 pp., A 1 and 2 86 pp.

Linsley, E. G., and J. A. Chemsak. 1972. Cerambycidae of North America, part No. 1. Taxonomy and classification of the sub-family Lepturinae. University of California publ. Entomol. Vol. 69.

Western Ecological Services Company (WESCO). Undated. Lower San Joaquin River snagging and clearing project endangered species data report; valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*). Report submitted to U.S. Army Engineer District, Sacramento. Contract No. DACW05-84-P-1051. 15 pp.

U.S. Fish and Wildlife Service. 1984. Valley elderberry longhorn beetle recovery plan. U.S. Fish and Wildlife Service, Portland, Oregon. 62 pp.

PALMATE-BRACTED BIRD'S-BEAK

(*Cordylanthus palmatus*)

CLASSIFICATION: Endangered 51 FR 23765

CRITICAL HABITAT: None designated

DESCRIPTION:

This annual herb of the snapdragon family (*Scrophulariaceae*) attains a height of 4 to 12 inches and produces several to many spreading ascending branches from near the base of the main stem. The pale stems are sparsely to densely hairy, often with glandular excretions of salt crystals evident on the herbage. The leaves and stems are grayish green and often very pale. The small pale whitish flowers, 1/2-inch to 1 inch long, are arranged in dense clusters (spikes) and densely surrounded by herbaceous leaflike bracts. Seedlings in late March or April. The species flowers in late spring through the summer.

DISTRIBUTION:

Historically the species was collected from seven scattered locations in Fresno, Madera, San Joaquin, Yolo, and Colusa Counties. In 1982 a new location was discovered near Livermore in Alameda County and in 1987 a colony was discovered on the Colusa National Wildlife Refuge in Colusa County. The latter stand may represent a remnant of the former populations to occur in the general area. At present four extant populations are known. These include the Livermore and Colusa NWR colonies, one near Woodland, Yolo County, and one on the Mendota State Wildlife Area, Fresno County. Additional colonies may occur in appropriate alkali sink habitats in these regions of the Central Valley and inner coast range valleys.

SPECIAL CONSIDERATIONS:

Population fluctuations are common in the palmate-bracted bird's-beak. These oscillations may be a result of changes in pollination success, rainfall patterns, freshwater influence, and marsh pollution. Consequently, researchers should take into account the unreliability of a single-season survey.

REFERENCES FOR ADDITIONAL INFORMATION

Chuang, T. I., and L. R. Heckard. 1971. Observations on root-parasitism in *Cordylanthus* (Scrophulariaceae). Am. J. Bot. 58:218-228.

Chuang, T. I., and L. R. Heckard. 1973. Taxonomy of *Cordylanthus* subgenus *Hemistegia* (Scrophulariaceae). Brittonia 25:135-158.

Ferris, R. S. 1918. Taxonomy and distribution of *Adenostegia*. Bull. Torrey Bot. Club. 45:399-423.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
300 South Ferry Street
Terminal Island, California 90731

March 5, 1991 F/SWR14:TDW

Colonel Lawrence R. Sadoff
District Engineer
Sacramento District
Corps of Engineers
650 Capitol Mall
Sacramento, California 95814

Dear Colonel Sadoff:

This letter is in response to your request for classification regarding the presence of winter-run chinook salmon in the project areas of the Sacramento System Evaluation, Phases II-V.

As we understand the project, all work will take place in-board of the levees with no in-river work anticipated. Winter-run chinook salmon will not be impacted by the project as proposed. Therefore, there is no need to proceed further with the Section 7 consultation process on the project. If, however, it is later determined that any of the phases will involve in-river work, please contact us as soon as possible so we may re-initiate consultation.

If you have questions concerning these comments or wish to discuss the project further, please contact Diane Windham of my staff at: National Marine Fisheries Service, 777 Sonoma Avenue, Room 325, Santa Rosa, California 95404; telephone (707) 578-7513.

Sincerely,

E.C. Fullerton
Regional Director

APPENDIX C

March 15, 1991

Environmental Resources Branch

Mr. Wayne S. White
Field Supervisor of Fish and
Wildlife Enhancement
Fish and Wildlife Service
2800 Cottage Way, RM E-1803
Sacramento, CA 95825

Dear Mr. White;

This is our biological assessment for the Sacramento Flood Control Project System Evaluation Phases II - V. Enclosed is a biological data report which describes the potential impacts of the proposed project on the Federally listed bald eagle, American peregrine falcon, winter-run Chinook salmon, valley elderberry longhorn beetle, and palmate-bracted bird's beak. The following additional species of concern (Candidate or recommended for Candidate status) are also described: ferruginous hawk, tricolored blackbird, Sacramento splittail, delta smelt, San Joaquin pocket mouse, San Joaquin valley woodrat, California tiger salamander, California red-legged frog, giant garter snake, Sacramento valley tiger beetle, Sacramento anthicid beetle, vernal pool branchinecta, California linderiella, Suisun aster, heart-scale, California hibiscus, delta tule pea, Mason's lilaeopsis, little mousetail, and Colusa grass. All of these species were listed by the Service as possibly occurring within the project area.

It is our biological assessment that the project, Phases II through V, is not likely to adversely affect the five listed species. Information on this is summarized in the paragraphs that follow and explained more fully in the enclosed report. We hereby commit to further coordination/consultation with your office to confirm this finding; an enviornmental document will be prepared and coordinated to describe impacts to all significant resources for each individual Phase of the project. If an adverse impact to any of the five listed species should become apparent during this process, we would then supplement this biological assessment with that new information.

The California Natural Diversity Data Base (1989) contains no records of bald eagle occurrence within the proposed project vicinity although they are present nearby. Nesting is not expected to occur within the project area but it is possible that eagles forage, perch, or roost in the project vicinity. If eagles do visit the area, temporary disruption of foraging, perching, and roosting might occur as a result of construction activities and removal of some trees and snags. Appropriate mitigation for such losses would be coordinated with the Service. During the preparation of supplemental environmental documents for each Phase,

additional investigation and field observations will be completed in order to obtain site specific information on project impacts to this species.

There are no records in the California Natural Diversity Data Base (1989) of peregrine falcon presence in the project vicinity. Suitable nesting habitat does not appear to exist within the area. It is possible that perching, roosting, or foraging falcons are sometimes present, therefore, further investigation and field observations will be completed during preparation of specific project Phase supplemental environmental documents.

Winter-run chinook salmon are expected to occur seasonally throughout the project area, from the mouth of the Sacramento River in the Sacramento-San Joaquin Delta to areas beyond Red Bluff. Project activities are not expected to take place in the water and measures will be implemented to ensure that soils and construction materials do not enter the water. No impacts to aquatic resources, including the winter-run chinook salmon, are anticipated due to project activities.

While the California Natural Diversity Data Base reports just ten occurrences of the valley elderberry longhorn beetle (VELB) in the immediate project area, it is expected that VELB habitat is present along the river and streams throughout the length of the project area. It is likely that there will be some disturbance of VELB habitat due to project activities. During the preparation of supplemental environmental documents for each project Phase, surveys will be conducted to determine the presence and characteristics of the elderberries (including indications of VELB presence) occurring in locations where construction activities will take place. Coordination with the Service will be maintained throughout this process and appropriate mitigation will be implemented.

There are no records in the California Natural Diversity Data Base (1989) of palmate-bracted bird's beak occurrence in the project area. Additional investigation will be necessary to identify palmate-bracted bird's beak habitat in the project area. Field visits may then be required in order to establish the presence of this species. At that time a more thorough evaluation of possible project impacts to this plant will be possible.

Data available at this time indicate that the Federally listed bald eagle, peregrine falcon, and palmate-bracted bird's beak do not occur within the project area. Confirmation of these results will be obtained during preparation of the supplemental environmental documents to be provided for each project Phase. The Federally listed winter-run chinook salmon, while present in the project vicinity, is not expected to be affected by the project. The Federally listed valley elderberry longhorn beetle is known to exist within the project vicinity and it is likely that some VELB

habitat will be disturbed during construction activities. Mitigation will be coordinated with the Service. Analysis of project impacts to the other twenty species of concern listed above will be provided in the supplemental environmental documents to be prepared for each project Phase.

Please advise us if you concur in the biological assessment. If you have any questions, please contact Tanis Toland (916) 551-1880.

Sincerely,

Laurence R. Sadoff
Colonel, Corps of Engineers
District Engineer

Enclosure

Distribution:
Pete Bontadelli, Director, Department of Fish and Game, 1416 Ninth Street, Sacramento, California 95814
Mr. Raymond Barsch, General Manager, The Reclamation Board, 1416 Ninth Street, Room 455-6, Sacramento, California 95814

cc:
Plng Div
ERB
Eng Div
LCPM

TOLAND
KINDEL
ENG
YEP
PAHL
WHITNEY
KORMAN
MASON
SADOFF

BIOLOGICAL DATA REPORT
SACRAMENTO FLOOD CONTROL PROJECT
SYSTEMS EVALUATION PHASES II - V

Tanis J. Toland
U.S. Army Corps of Engineers
Sacramento District

March 1991

SACRAMENTO FLOOD CONTROL PROJECT
BIOLOGICAL DATA REPORT

7.0 LIST OF PREPARERS

8.0 APPENDICES

Appendix A FWS letter (12/14/90) regarding endangered species
Appendix B Natural Diversity Data Base Description
Appendix C National Marine Fisheries Service letter (3//5/91)

SACRAMENTO FLOOD CONTROL PROJECT
BIOLOGICAL DATA REPORT

1.0 INTRODUCTION

1.1 PURPOSE AND NEED

This Biological Data Report was prepared for the Sacramento Systems Evaluation Phases II - V in compliance with Section 7(c) of the Endangered Species Act. The report documents the species of concern occurring within the general vicinity of those parts of the U.S. Army Corps of Engineers' (COE) Sacramento River Flood Control Project which are under consideration for reconstruction. The proposed project involves the modification of existing levees within the Sacramento River system (Map 1) in order to restore them to the design conditions originally authorized by Congress.

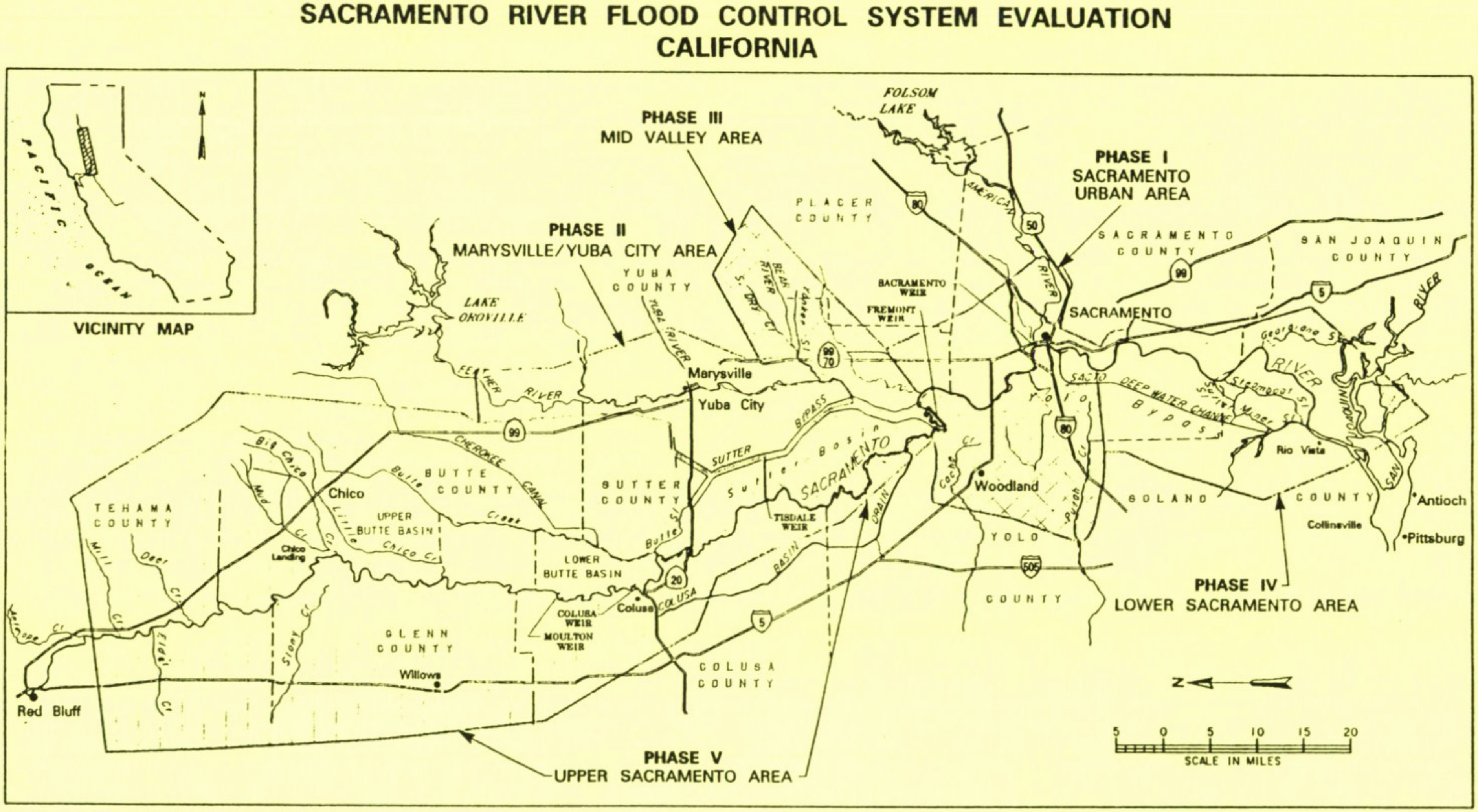
The U.S. Fish and Wildlife Service (FWS) listed 25 species of concern (Appendix A) as possibly occurring in the project vicinity (FWS December 14, 1990; FWS February 13, 1990). Five of these species are federally listed as threatened or endangered, seventeen are listed as Candidate species, and three are recommended for listing as Candidate species.

The following information regarding the federally listed threatened and endangered species is included in this report: current legal status, distribution, habitat requirements, the status of the populations in the proposed project area, possible reasons for endangerment, and an analysis of the potential impact of the project on these species. Information for Candidate species is presented in less detail. These species will be more fully described and evaluated in the supplemental environmental documents which will be prepared for each project Phase.

1.2 PROJECT AREA

The project area is located in the Central Valley in northern California and includes the Sacramento River from Red Bluff to Collinsville. Also included are portions of the American, Feather, Yuba and Bear Rivers, Yolo and Sutter Bypasses, Colusa Basin Trough and other minor tributaries. The environment potentially affected by the project consists of low-lying parts of the Sacramento Valley and the Sacramento-San Joaquin Delta and includes channels, riverbanks, levees, berms, flood plains within the levees, immediately adjacent lands, and contiguous riparian woodlands. Portions of the following counties fall within the project area; Tehama, Glenn, Butte, Colusa, Sutter, Yuba, Yolo, Sacramento, Placer, Solano, and San Joaquin counties (see Map 1).

Agriculture is the predominant land use in the Sacramento River basin and along the project reaches in Phases II through V.



Map 1. General Project Area

Row crops, orchards, and grain crops are grown on much of the land, and many irrigation diversions are made from the rivers. The project area in Phase II also includes the urbanized lands in and around Marysville and Yuba City. These lands consist largely of residential, commercial and industrial development. Minor residential and commercial development exists in or near Rio Vista, Isleton, Walnut Grove, Lock, and Hood. Further north, there is scattered development along the river in small communities such as Knight's Landing, Grimes, Colusa, Princeton and Butte City.

Six plant communities are found along the Sacramento River and tributaries within the general project area. These include valley grassland, agricultural, riparian grassland, shrub scrub, riparian and marshland. The vegetation along the river varies according to differences in local climatic conditions, topography, soil type and land use. The levee crowns are generally maintained with gravel to provide access for maintenance.

1.3 DESCRIPTION OF PROJECT

1.3.1 Background

The Sacramento River Flood Control Project consists of approximately 1,000 miles of levees plus overflow weirs, pumping plants and bypass channels that protect communities and agricultural lands in the Sacramento Valley and Sacramento-San Joaquin Delta. The Sacramento River Flood Control System Evaluation is being conducted to determine the long-term integrity of the flood control system for the Sacramento River and its tributaries. It was initiated after the 1986 flood event severely stressed the existing levee system in the study area, caused levee failures, and raised the question of levee reliability.

The Sacramento River Flood Control System Evaluation, authorized by the Energy and Water Development Appropriation Act of 1987, is divided into five phases. The first two phases include the most heavily populated areas, the Sacramento Urban (Phase I) and the Marysville/Yuba City areas (Phase II). The final three phases will evaluate areas in the Mid-Valley (Phase III), Lower Sacramento (Phase IV) and Upper Sacramento (Phase V). This Biological Data Report will address Phases II through V (see Map 1).

1.3.2 Construction Features

Six alternatives are being considered to address the condition of the levees in the Sacramento River system. They are: 1) no action; 2) construct drainage improvements at or near the landward toe of the levee embankment; 3) raise levees; 4) raise levees and construct drainage improvements at or near the landward toe of the levee embankment; 5) construct a cutoff wall; and 6) construct drainage improvements and stabilizing berm at landside levee toe.

These alternatives are described in greater detail below.

1) No Action. This alternative would consist of maintaining the project levees in their current condition. This alternative is likely to result in levee embankment problems and potential levee failure that could cause extensive flooding, or significant levee failure that could include loss of life. The flooded areas would be drained following flooding, and no significant long-term adverse impacts to environmental resources would be expected as a result. Significant costs and resources would be needed to repair or replace structures damaged by flood waters.

2) Construct Drainage Improvements at or Near the Landward Toe of the Levee Embankment. This alternative would consist of constructing drainage improvements at or near the landward toe of the existing levee embankment. The drainage improvements would require clearing, excavating and constructing gravel drains, probably within 10 feet of the landward toe of the existing levee embankment. Excess drainage water would be collected and pumped back into the river system or allowed to flow overland to collector ditches.

3) Raise Levees. This alternative would consist of raising the existing levee crown in those levee reaches that do not have the minimum required design freeboard above the design water surface elevation. Levee raising would primarily involve widening the levee embankment to the landward side. Also, levee raising could result in extending the landward side of the levee up to 15 feet.

4) Raise Levees and Construct Drainage Improvements at or Near the Landward Toe of the Levee Embankment. This alternative would be a combination of (1) and (2).

5) Construct a Cutoff Wall. Construction of a cutoff wall entails digging a trench down the middle of the levee and filling it with an impervious material. This creates a barrier to the movement of water through the levee and foundation and prevents landside levee boils during flood events.

6) Construct Drainage Improvements and Stabilizing Berm at Landside Levee Toe. This alternative would include clearing and grubbing the lower half of the landward levee slope and placing drain rock over the lower slope. The drain material would be covered and a berm, approximately 10 to 15 feet wide and 5 to 10 feet high, would then be constructed. Installation of the drain rock serves to strengthen the levee by permitting the drainage of water, while retarding the loss of levee material. The combination of the berm with the drain rock adds strength to the levee embankment and permits drainage of seepage waters to prevent piping

of soil materials. The addition of the berm also acts to prevent levee sloughing. This alternative also includes relocating any irrigation ditches that are adjacent to the landside levee toe.

2.0 METHODOLOGY

Information for this report was derived from documents in the files of both the Environmental Resources Branch of the COE and the Sacramento office of the FWS. The California Natural Diversity Data Base (last update 1989) was used to identify records of species presence within the project area (See Appendix B for a description of the California Natural Diversity Data Base, NDDB.) No field studies were conducted during the preparation of this report.

3.0 RESULTS AND DISCUSSION

3.1 OVERVIEW OF SPECIES OF CONCERN

Five of the species that the FWS indicated may occur within the project area are federally listed as threatened or endangered. These include two birds, one fish, one insect, and one plant. There are several other species of concern which may occur in the project vicinity. One fish and one plant are Category 1 Candidate species and two birds, one fish, two mammals, two amphibians, one reptile, and six plants are Category 2 Candidate species. One insect and two shrimp have been recommended for Category 2 status.

A search of the NDDB revealed that 12 of the 25 species listed by the FWS occur within the study area. Five of these are Federally listed species. Preliminary analysis suggests that some of these species may occur within the actual project area. It should be noted that six of the Candidate species are not included in the data base. Table 1 shows a summary of the results of the NDDB search.

At a later date, appropriate field investigations will be conducted and more detailed information presented for each project Phase.

3.2 LISTED SPECIES

3.2.1 BALD EAGLE - Haliaeetus leucocephalus
Family: Accipitridae

Status: The Bald Eagle is listed as Endangered by both the state and federal governments. As of February 1990 the FWS announced it would undertake a comprehensive study of bald eagle populations to determine if the species would warrant reclassification from endangered to the less critical threatened category.

Description: Adults are brownish-black with white head, neck, and

Table 1 - Summary of the California Natural Diversity Data Base Search Results

Category	Common Name	Fed.+ Categ.	IPA*	IPA + IPV*
Mammals	San Joaquin pocket mouse	2	1	1
	San Joaquin valley woodrat	2	0	1
Birds	Bald eagle	E	0	0
	American peregrine falcon	E	0	0
	Ferruginous hawk	2	--**	--
	Tricolored blackbird	2	6	14
Fish	Winter-run chinook salmon	T	0#	2
	Sacramento splittail	2	0	0
	Delta smelt	1	--	--
Amphibians	California tiger salamander	2	1	1
	California red-legged frog	2	0	--
Reptiles	Giant garter snake	2	3	24
Invertebrates	Sacramento Valley tiger beetle	2R	--	--
	Sacramento anthicid beetle	2	1	2
	Valley elderberry longhorn beetle	T	10	10
	Vernal Pool Branchinecta	2R	--	--
	California linderiella	2R	--	--

Plants	Palmate-bracted bird's beak	E	1	0
	Suisun aster	2	1	1
	Heart-scale	2	0	2
	California hibiscus	2	6	9
	Delta tule-pea	2	2	2
	Mason's lilaeopsis	2	10	12
	Little mousetail	2	0	0
	Colusa grass	1	0	1

+ Federal Category (see Appendix A)
* IPA = Directly in the possible construction zone.
  IPV = Outside the likely construction zone but relatively close to the site.
  IPA + IPV = Total locations recorded within the biological study area.
While not documented in the NDDB, it is likely that winter-run Chinook salmon are found throughout many parts of the Sacramento river system.
** -- The species is not included in the Data Base.

tail. The females are larger than the males as is common in most raptors. The wingspan ranges from about 6.5 - 8.0 ft. and weights range from 8.0 - 14.0 lbs. The plumage of young birds is mostly brown and blotched irregularly with white or buff colors. As the birds approach maturity, 4 or 5 years of age, the head, neck, and tail become progressively whiter over several annual molts (DFG 1985).

Habitat: This species is found in the vicinity of large lakes, rivers, and reservoirs. The bald eagle looks for open water that supplies an abundance of fish. The bald eagle will also prey on injured or shot and crippled waterfowl, during or immediately after the hunting season (Terres 1980). Perch trees adjacent to eagle foraging areas are important habitat features (DFG 1985).

Bald eagles roost communally throughout the winter range. Weather conditions strongly influence eagle activity patterns in the winter. Open water on major river systems usually attracts bald eagles, but they will also use arid valleys in the winter (USFWS 1978).

Most nests are constructed in dominant or co-dominant ponderosa and sugar pines within 1 mile of a waterfront, mainly reservoirs (DFG 1985). Nests have been found from 7 - 8 ft. across and 12 ft. deep, built in trees 1- 150 ft. above the ground (Terres 1980).

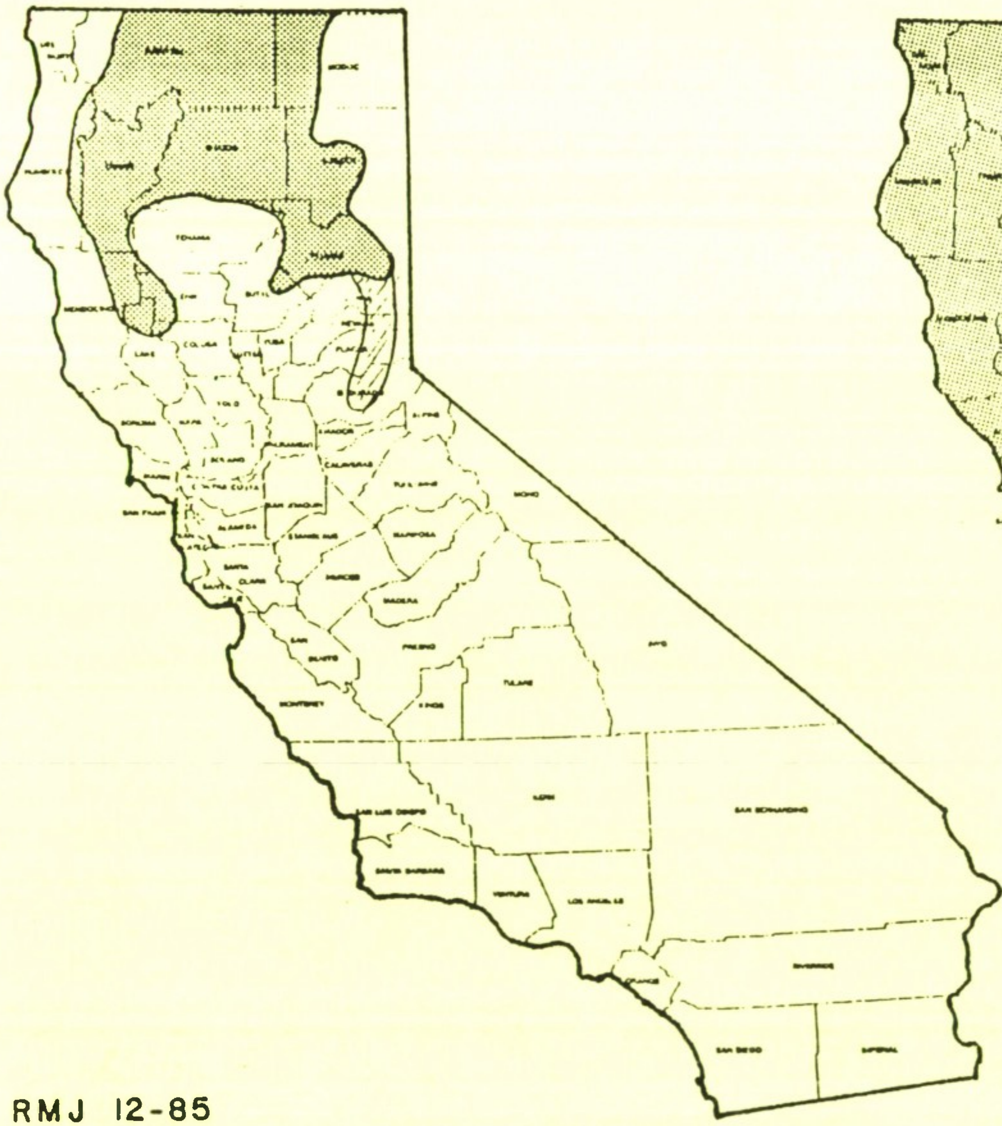
Distribution: Historically the bald eagle inhabited all of the North American continent and used breeding grounds on most of the continent (USFWS 1986). Breeding grounds have decreased and now only include Alaska, Canada, the Pacific Northwest states, the Great Lake states, Florida, and Chesapeake Bay. The winter range includes most of the breeding range but extends mainly from southern Alaska and southern Canada southward (USFWS 1986).

Project Area Occurrence: A search of the Natural Diversity Data Base (NNDB 1989) reported no bald eagles within the project vicinity. Bald eagles are known to nest in Butte county at the Oroville Reservoir and there is one record of a nesting attempt at Stony Gorge Reservoir in Glenn County (Detrick 1986). Figure 1a shows the locations of nesting bald eagles in California. None of these nesting sites fall within the immediate project vicinity. Important bald eagle wintering areas are located within three of the counties included within the proposed project area (see Figure 1b). These counties are Tehema, Butte, and Glenn counties (Detrich 1986). Wintering bald eagles have also been found in Yuba County. Figure 2 shows known wintering and nesting sites which occur within or adjacent to the project area. It is possible that bald eagles are present at times within the proposed project area.

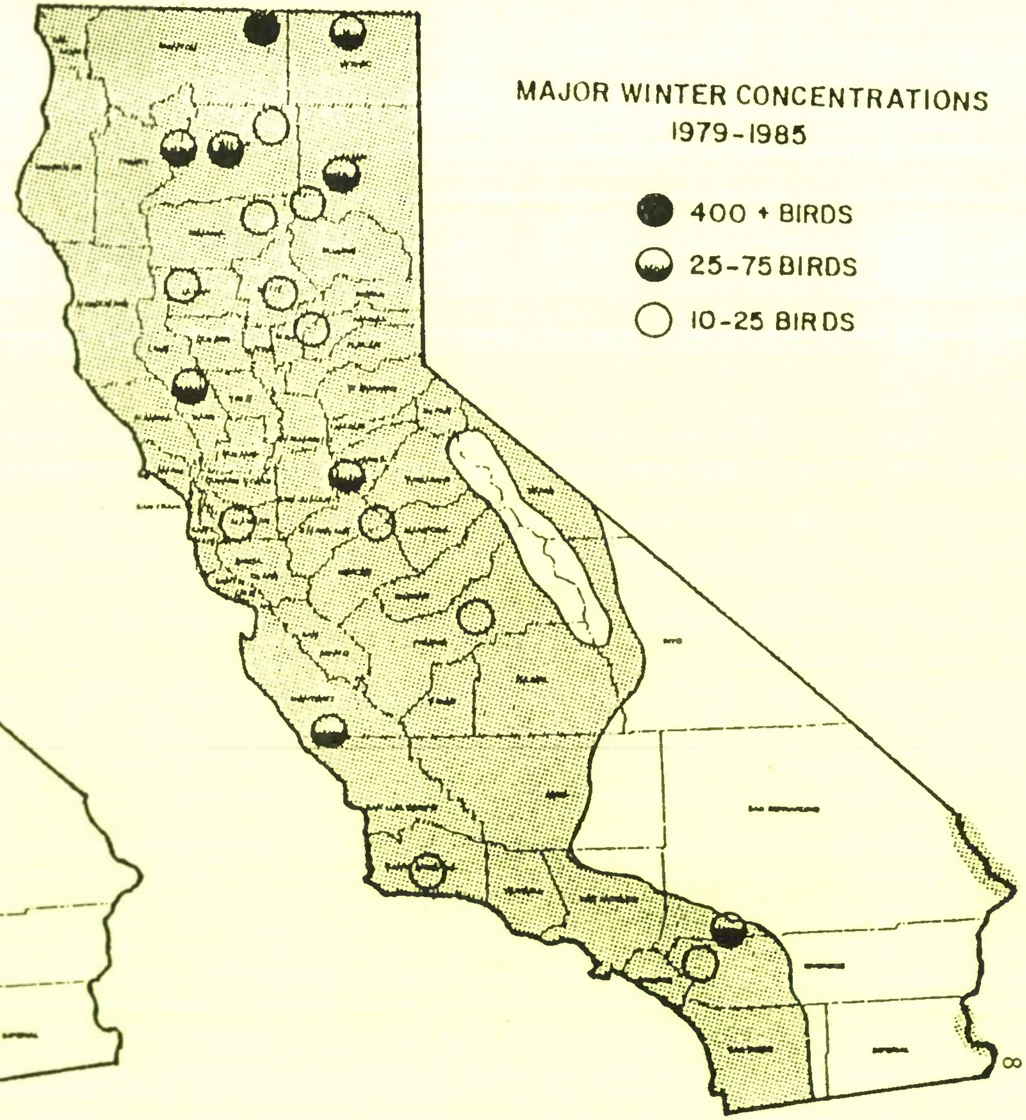
Project Impacts: It is unlikely that bald eagles nest in the areas proposed for project activities. It is possible that wintering and

DISTRIBUTION OF BALD EAGLES IN CALIFORNIA

a) BREEDING RANGE 1980-198~~7~~6
(~~75 RECENTLY OCCUPIED TERRITORIES~~)



b) WINTER DISTRIBUTION
(APPROX. 1000 INDIVIDUALS)



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RMJ 12-85

Figure 1

SACRAMENTO RIVER FLOOD CONTROL SYSTEM EVALUATION CALIFORNIA

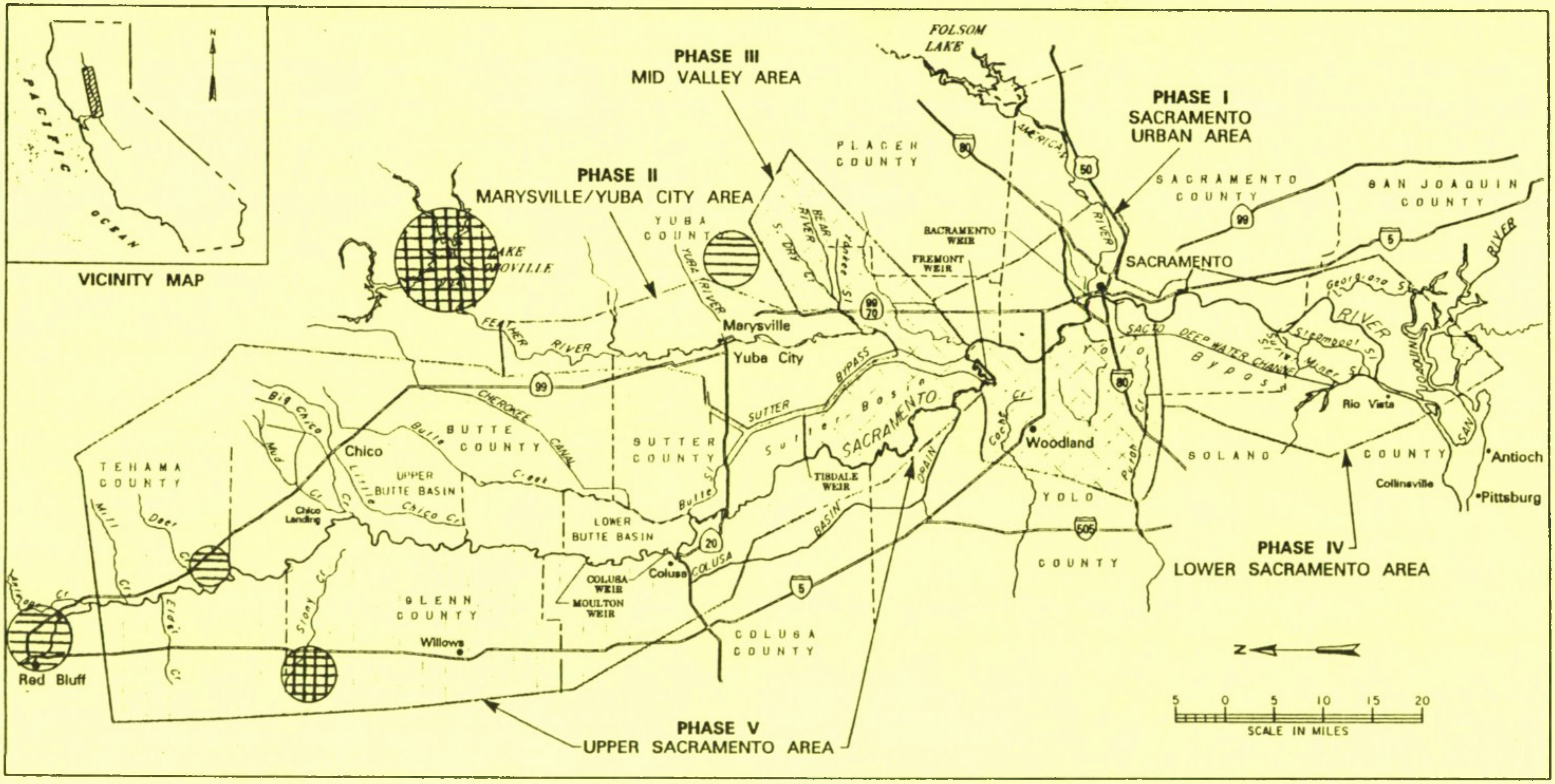

Figure 2 - Bald eagle

Wintering

Nesting

(Source Detrich 1979)

foraging eagles may occur in some part of the project area. Field surveys will be required to corroborate this. Mature trees and snags provide roosting and perching habitat and their removal should be avoided in areas likely to be used by the eagles. Any activities adversely affecting fisheries could have a negatively impact the eagle's prey base. Nesting or wintering eagles occurring within or adjacent to construction activity may temporarily abandon the area due to construction activities and noise.

Endangerment: Habitat loss continues to be the most significant long-term threat to all bald eagle populations. Urban and recreational development, logging, mineral exploration and extraction, and all other forms of human activities are adversely affecting the suitability of breeding, wintering, and foraging areas (USFWS 1986).

Shooting also continues to be the most frequently recorded single cause of bald eagle mortality, though the rate seems to be declining. Of 1429 eagles examined between 1963 and 1984, 23% succumbed to gunshot (USFWS 1986).

Pesticide use against rodents and insects and electrocution due to specific electrical lines that do not meet raptor protection guidelines are also an endangerment factor for the bald eagle (USFWS 1986).

3.2.2 PEREGRINE FALCON - Falco peregrinus
Family: Falcon

Status: The Peregrine Falcon is currently listed as Endangered by the federal and the California state governments. Studies are being conducted to determine if the falcon should be downgraded to the less critical "threatened" category.

Description: Adult peregrine falcons are outwardly similar but the female is larger. This falcon is 15-20 in long and has a wingspread of 43-46 in. The wings are long and pointed. Adults are characterized by a slaty back and pale underparts, with spots and bars. Young birds are dark brown above and heavily striped below. The peregrine's flight pattern resembles that of the domestic pigeon (Terres 1980).

Habitat: Peregrine falcon habitat basically consists of nesting, perching, roosting and foraging areas in relatively open country. Some winter movement may occur, particularly in the northern part of the range (USFWS 1982).

The American peregrine falcon nests almost exclusively on cliffs, usually near water. Tree nesting is virtually unknown in this population, and nesting on man-made structures is rare. There

are records of nests on dunes or other low mounds, but these are infrequent and no recent records exist. Characteristics of nesting cliffs appear to be sheer cliffs of 150 ft. or more in height and a small cave or overhung ledge large enough to contain three or four full-grown nestlings. Suitability of the cliff is enhanced by several holes or ledges that can be used in alternate years as nests (USFWS 1982).

Common foraging grounds for the bird generally include wooded areas, open grasslands, coastal strands, and bodies of water. Wooded areas near water attract a diverse avifauna, and bodies of water provide open areas where prey cannot easily escape attack. Marshes, savannas, and shorelines are also common foraging areas (USFWS 1982).

Distribution: Historically the peregrine falcon was one of the most widely distributed of all bird species. Peregrines were recorded in most every major land mass of the earth except Antarctica and were found breeding over most of the range (Hickey 1969). Three subspecies were known in North America. The American peregrine falcon has historically nested throughout North America from the boreal forest south into Mexico wherever suitable nesting and foraging habitat occurred. The history of the peregrine falcon in California was noted in 1944 by Grinnell and Miller and in 1946 by Bond, they considered the peregrine in California to be a fairly common falcon, and found it nesting on coastal and insural sea cliffs, as well as inland cliffs. Based on an analysis of Bonds unpublished notes and other sources, data was compiled that estimated that California supported 100 pairs of reproducing peregrines each year prior to 1947. Recent investigations have suggested that the population was more extensive and this estimate is very conservative (USFWS 1982).

Currently the peregrine is distributed throughout California. Productivity enhancement by state and federal agencies has contributed to the rise of the peregrine populations. Captive breeding and hacking are successful forms of enhancement. Of 211 peregrines hacked into the wild between 1974 and 1979, 71% reached the age of independence (USFWS 1982).

Project Area Occurrence: A search of the NDDB (1989) found no records of peregrine falcon in the project area and appropriate nesting habitat does not exist within or adjacent to the project location. Presence of roosting or foraging falcons will need to be determined through further research and field investigation.

Project Impacts: It us unlikely that the peregrine falcon exists within the project area. If this is verified through additional investigation, then the project can be expected to have no impact upon this species. However, if falcons are found to occur within the project area, any construction activities nearby are highly likely to disturb this very sensitive bird.

Endangerment: Previous endangerment was due to the use of pesticides such as DDT and DDE. Egg shell thinning and behavioral differences caused by the pesticides increased mortality and decreased reproduction habits. Once the breeding population was reduced, natural mortality factors became significant contributors to the further decline of this species.

3.2.3 WINTER-RUN CHINOOK SALMON - Oncorhynchus tshawytscha
Family : Salmonidae

Status: An emergency listing in August of 1989 placed the chinook salmon, in the Sacramento River, on the Federal Endangered Species list as a threatened candidate. The emergency listing, valid for 240 days, also called for a designated section of the river to be claimed as critical habitat (USFWS 1990).

Description: Winter run Chinook salmon are distinguishable from the other runs of chinook salmon in the Sacramento River by the timing of their upstream migration and spawning season. They return almost exclusively as 3 year olds to the river for spawning, after having spent several years in the ocean (USFWS 1990).

Juveniles up to about 3 inches are considered sub-smolts. Sub-smolts are fish that are not ready to journey to salt water and are still in the rearing stage. Fish over 3 inches are referred to as smolts, these fish are ready for the journey downstream at relatively fast rates (USFWS 1985).

Adult migration past Red Bluff Diversion Dam on the Sacramento River starts in mid-December and continues into mid-August. The bulk of the spawning occurs in May and June in the main stem of the Sacramento River upstream from Red Bluff. Juvenile seaward migration begins in August and continues through October, with a peak between mid-September and mid-October (USFWS 1988).

Habitat: Winter run Chinook salmon require clean, free-running water for migration, spawning and rearing. Clean gravels are essential for successful spawning. Water temperatures during spawning must range somewhere between 42.5 degrees fahrenheit and 57.5 degrees fahrenheit, although migration and rearing temperatures can be slightly higher. Water velocities over spawning gravels should be about 2 to 3 feet per second. Fluctuation in flows should be minimal during spawning and incubation periods. During juvenile "outmigration" fluctuations can also cause stranding of juveniles in side channels and bypasses (USFWS 1988).

Maximum production also requires that there be no stream areas (structures) which cause prolonged adult salmon delays, block salmon from reaching their normal spawning area, or provide

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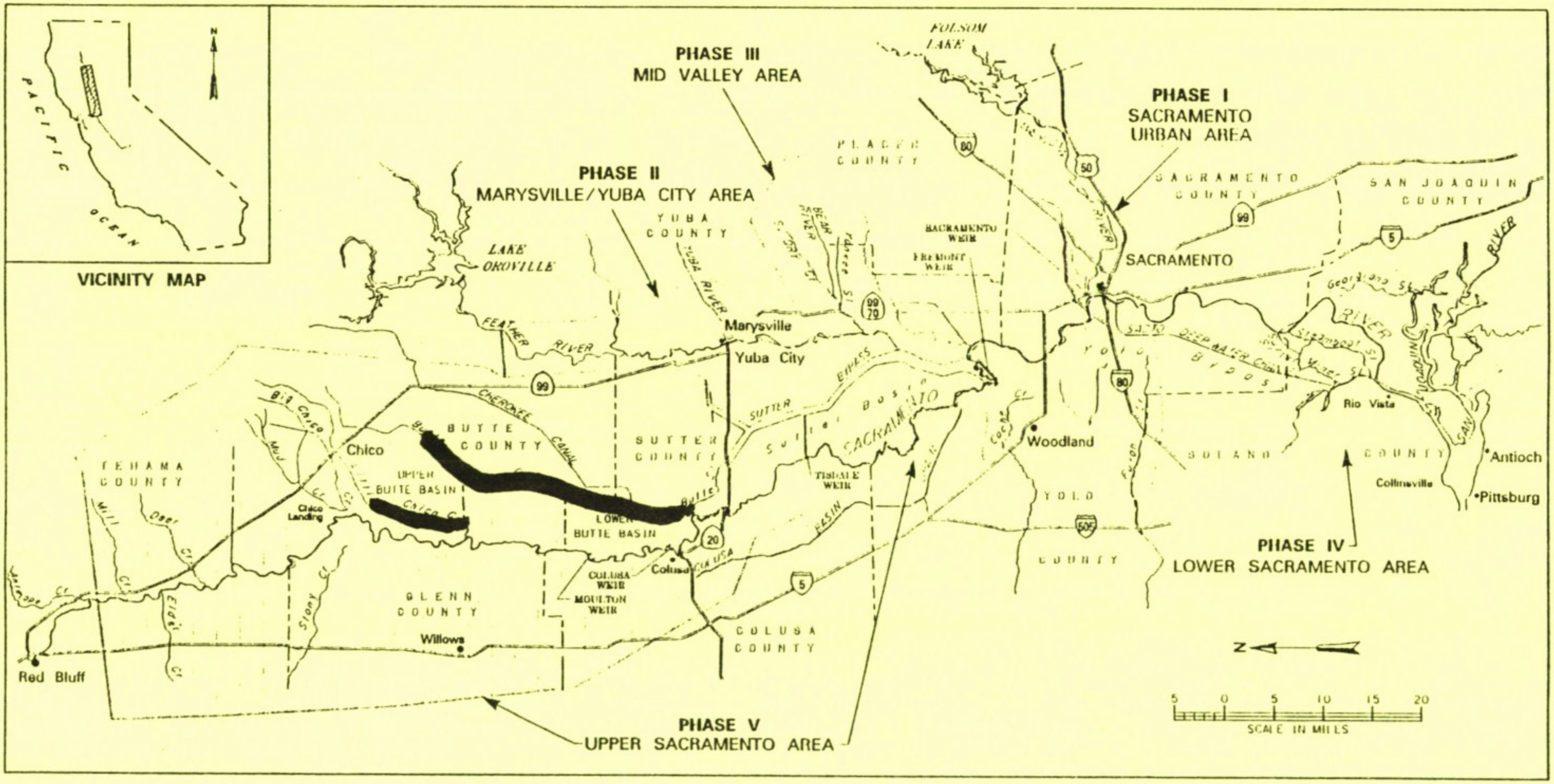

Figure 3 - Winter-run Chinook Salmon

(Source NDDB 1989)

conditions where predators accumulate and prey on juveniles (USFWS 1988).

In addition to suitable spawning and incubation stream flows and temperature there must be free running river from the spawning areas to the ocean. Diverting portions of this flow into unscreened side channels and diversions causes proportionate losses among the juvenile "outmigrants" (USFWS 1988).

Distribution: The winter run chinook salmon was recorded spawning in the Sacramento river as early as 1902. Since the construction of Shasta and Keswick dams on the Sacramento river, the salmon has been limited in its spawning areas. The population has decreased from 40,000 spawners to 2,000 in the last 20 years (USFWS 1988). The winter run chinook occurs only in the Sacramento River System (Restoring the Balance 1988).

Project Area Occurrence: Winter-run chinook salmon inhabit the waters of the Sacramento River from its mouth in the Sacramento-San Joaquin Delta to spawning areas beyond Red Bluff. Adult salmon migrate past the Red Bluff Diversion Dam from mid-December until mid-August. Most spawning occurs in May and June in the main stem of the Sacramento River upstream from Red Bluff. Juveniles migrate seaward from August until the end of October (USFWS 1988). There may be periodic residual runs in the small creeks near North Natomas. Winter-run chinook salmon are also known to be present in Little Chico Creek and Butte Creek (NDDB 1989) and Mill Creek (Figure 3).

Project Impacts: The proposed project is not expected to have an impact upon winter-run chinook salmon since project activities are designed to avoid or minimize alterations to the waterside of the levees and should not alter water quality, quantity, or temperature.

Endangerment: The chinook-salmon population has declined dramatically from 60,000-120,000 in the 1960's, to about 2,000 now. Major threats appear to be loss of spawning beds/gravel, and low flows or warm water due to drought and/or management practices. Logging, agriculture, gravel mining, road construction, and urban development cause erosion of soils, loss of streamside vegetation, poor water quality, and stream channelization, all leading to the loss of the salmon habitat (Restoring the Balance 1988).

3.2.4 VALLEY ELDERBERRY LONGHORN BEETLE - _Desmocerus californicus dimorphus_

Status: This species is Federally listed as Threatened. It has no State listing.

Description: In general, longhorn beetles are characterized by

somewhat elongate and cylindrical bodies with long antennae, often in excess of 2/3 of the body length. In contrast, males of Valley elderberry longhorn beetle (VELB) are stout-bodied and their elytra (thickened, hardened forewings) are coarsely punctured with a metallic-green pattern of 4 oblong maculations, surrounded by a bright red-orange border. The border eventually fades to yellow on museum specimens. The maculations are fused on some males, more closely resembling the nominate subspecies. Antennae are about as long as the body or slightly shorter. Body length is approximately 0.51 - 0.83 " (USACE 1990).

Females are more robust, elytra are subparallel, and the dark pattern is not reduced. Antennae reach about the middle of the elytra and body length is approximately 0.71 - 0.98 ". Both sexes of VELB are readily identified due to their distinctive appearance (USACE 1990).

Habitat: The beetle is host specific, maturing in and feeding as adults on elderberry (Sambucus spp.). The VELB prefers to inhabit trees with a girth of 5.91 - 25.6 " (USACE 1985).

Distribution: VELB is endemic to moist valley oak woodlands along the margins of rivers and streams in the lower Sacramento and upper San Joaquin Valleys of California, where elderberry grows. Although the entire historical distribution of VELB is unknown, the extensive destruction of riparian forests of the Central Valley of California strongly suggests that the beetle's range may have shrunk and become greatly fragmented. There is little information on former abundance of VELB for comparison with current population levels.

Project Area Occurrence: There are 10 known occurrences of the beetle within the project area (NDDB 1989). These sites occur along the Sacramento River between Colusa and the mouth of the Sacramento River at the Delta (Figure 4). Although these are the only recorded sites, there is VELB habitat all along both the Sacramento River and its tributaries and it will be assumed that this habitat contains VELB.

Project Impacts: Elderberrys are most likely to grow on the waterward side of the levees but may also occupy the landward side, especially where drainage ditches contain water during much of the year. Project alternatives requiring removal of soils and/or vegetation from either or both waterward and landward sides of the levees would affect existing elderberrys and would thus impact the VELB. Mitigation will be coordinated with the FWS.

Endangerment: During the past 150 years over 90 percent of the riparian habitat in California has been destroyed by agricultural and urban development. Due to the limited knowledge about the VELB's life history and its ecological requirements, precise threats to its survival are difficult to enumerate. Clearly the

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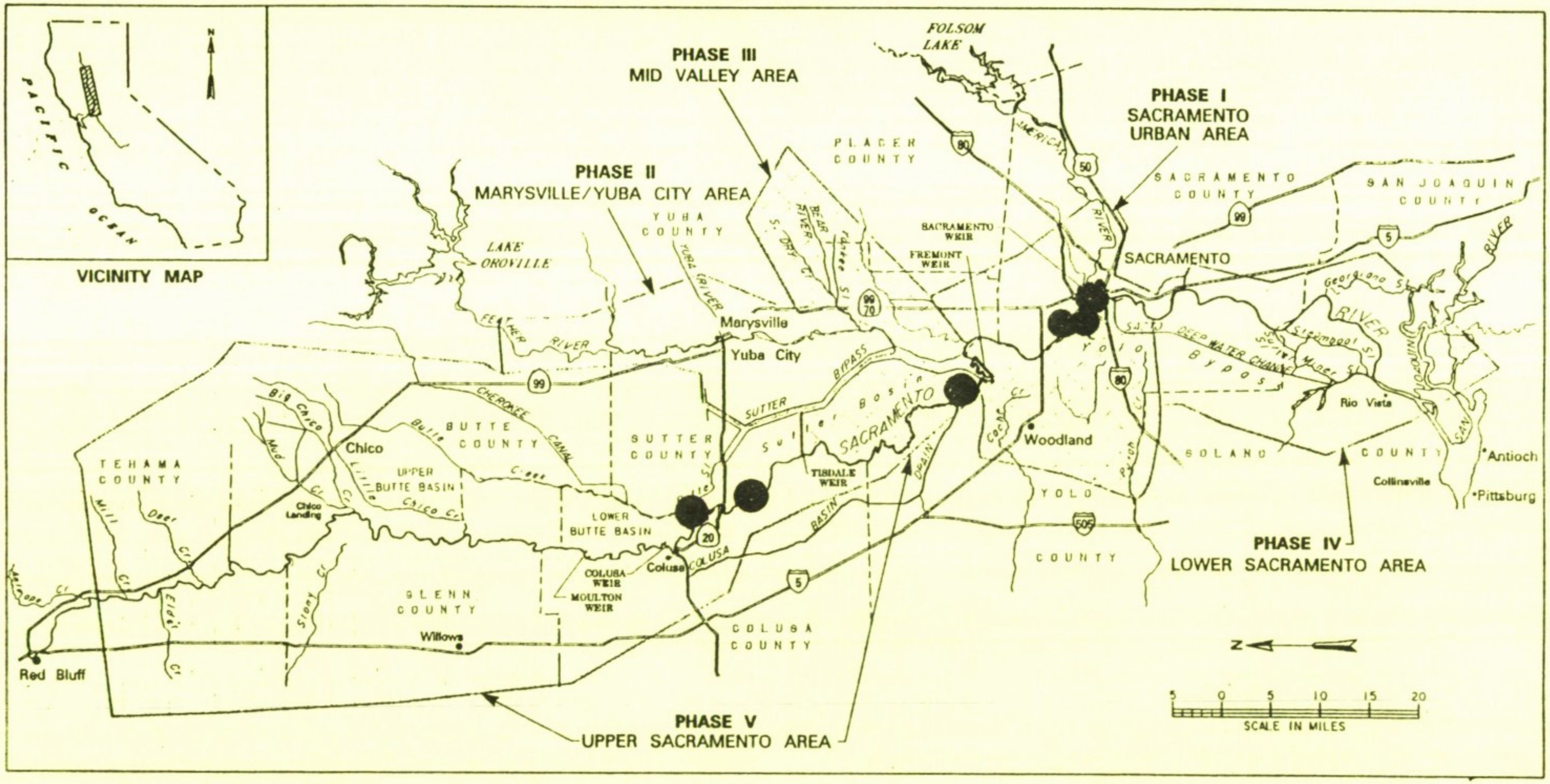

Figure 4 - Valley elderberry longhorn beetle

● Valley elderberry longhorn beetle

(Source: NDDB 1989)

primary threat to survival of the VELB has been and continues to be the loss and alteration of habitat by agricultural conversion, grazing, levee construction, stream and river channelization, removal of riparian vegetation, rip-rapping of shoreline, plus recreational, industrial, and urban development. Insecticide and herbicide use in agricultural areas may be factors limiting the beetle's distribution. The age and quality of individual elderberry shrubs/trees and stands as a food plant for VELB may also be a factor in the beetle's limited distribution (USACE 1990).

Riparian habitat is still being degraded by urban development and levee repair work along the rivers. There has been some successful elderberry transplantings in specific areas along the rivers. This has increased the viable habitat for the beetle (USACE 1990).

3.2.5 PALMATE-BRACTED BIRD'S-BEAK - Cordylanthus palmatus (Ferris)
Family: Scrophulariaceae

Status: Palmate-bracted bird's beak is listed as Endangered with both the federal and state governments. Listed endangered and threatened plants receive the full protection and authorities of the Endangered Species Act.

The California Native Plant Society (CNPS) inventories the plant on it's 1B list that categorizes species that are rare, threatened, or endangered in California and elsewhere. The CNPS gives the palmate-bracted bird's beak Rarity-Endangerment-Distribution (R-E-D) code of 3-3-3: occurrence limited to one or a few highly restricted populations, or present in such small numbers that it is seldom reported; endangered throughout it's range; and endemic to California.

Description: Palmate-bracted bird's beak is an annual herb of the Snapdragon family. It is branched with yellow roots, alternate leaves, an inner floral bract modified into a calyx-like structure, with a two lipped corolla. The plant stands 4 - 12 in. tall, with several to many ascending branches. The herbage is grayish-green and hairy, becoming glabrous. The leaves are oblong-lanceolate, 0.3 - 0.8 in. long, entire on the lower stem becoming lobed above with 1 - 2 pairs of lobes. The inflorescence is of dense spikes, 2.0 - 6.0 in. long. The floral bract has 2 - 3 lobes. The corolla is 0.6 - 0.8 in. long with a basal tube and inflated pouch, whitish, often with pale lavender striations along the pouch on the lower surface. The seed capsule is 0.2 - 0.3 in. long with 14 - 18 brownish seeds with conspicuously and deeply reticulate seed coat and prominent undulating crest. This plant must be identified during flowering which occurs from June - October (CNPS 1977).

Habitat: The plant is found in seasonally flooded, saline-alkali (black-alkali) soils called pescadero clay of lowland flats and

plains (CNPS 1977). The CNPS classifies the species as occurring in chenopod scrub which consists of intricately branched, microphallus shrubs, usually gray, most commonly on fine textured, alkaline and/or saline soils in areas of impeded drainage. The diversity of such an area is usually low to monotonous (CNPS 1988). Common palmate-bracted bird's beak associates are iodine bush (Allenrolfea occidentalis), alkali heath (Frankenia grandifolia var. campestris), alkali weed (Cressa truxillensis), salt grass (Distichlis spicata), and pickleweed (Salicornia spp.) The elevational range for the plant is 0 - 100 feet (CNPS 1989, CNPS 1988).

Distribution: Historically this species was known to occur in scattered alkaline areas in the Sacramento and San Joaquin valleys. There are eleven recorded element occurrences of the plant. Of the eleven, three are known to be extirpated. Another three occurrences, located in the general areas of Firebaugh, Stockton, and College City, could not be found during field surveys conducted in the 1960's. Part of the southern stand of the Willow Slough occurrence was plowed in 1982, but the potential for recovery appears good (CNPS 1988, CNPS 1989).

Of the four element occurrences definitely known to remain, one is a small transplanted population protected within the Mendota Wildlife Management Area, Fresno County; another is found in the City of Woodland, Yolo County; the third is found in Livermore, Alameda County; the fourth occurrence is located in the Colousa Wildlife Refuge on Fish and Wildlife Service lands. This location was recently discovered in 1989 (Bittman 1990, CNPS 1989).

Botanists knowledgeable on C. palmatus agree that the species has not been comprehensively searched for and that further field searches based on the distribution of "black alkaline" soils are likely to yield additional element occurrences (CNPS 1989).

Project Area Occurrence: No palmate-bracted bird's beak are documented as occurring within the project area (NDDB 1989). Extensive surveys for this plant have not been undertaken within the project vicinity. Before an accurate determination of the occurrence of this plant within the area can be made, appropriate habitat existing within the project area must be identified and field surveys conducted within those areas.

Project Impacts: Palmate-bracted bird's beak is not known to occur in the project area. However, should this plant be discovered, any construction activities taking place in its immediate vicinity are likely to disturb or destroy this very sensitive plant.

Endangerment: Palmate-bracted bird's beak is extremely rare and not at all vigorous. It's range coincides with a region of California that has been intensively developed for agriculture, livestock grazing, and urbanization. Population numbers have

fluctuated probably due to the annual nature of the plant and destruction by off-road vehicles (Bittman 1989).

Since the species depends on seasonally saturated soils, drainage alterations, or changes in topography could threaten the viability of the few remaining populations. Low population numbers may also threaten this annual plant through genetic depletion and reduced reproductive potential (Dept. of the Interior 1985). Thus the rarity of the plant, coupled with a habitat that is being "reclaimed" for agriculture, places palmate-bracted bird's beak in considerable jeopardy (CNPS 1977).

3.3 CANDIDATE SPECIES

3.3.1 FERRUGINOUS HAWK - Buteo regalis

Status: The ferruginous hawk is recognized by the FWS as a Category 2 Candidate species.

Description: The ferruginous hawk is 23 inches long with a 53 inch wingspan. It has a rust back and shoulders, a paler head, and white tail washed with pale rust. Large patches of white are present on the upperwing surface. As seen from below, flight feathers lack barring, and the rusty leggings form a conspicuous V against the whitish underparts. Immature hawks lack red leggings. The hawk often hovers when hunting and perches in trees, on poles, or on the ground (National Geographic Society 1983:196).

Habitat: The ferruginous hawk favors dry, open country and may perch in trees, on poles, or on the ground (National Geographic Society 1983:196).

Distribution: The ferruginous hawk is found in the western United States with occasional visits to Wisconsin, Illinois, Arkansas, Louisiana during migration. It is rarely found in Minnesota where it may also breed (National Geographic Society 1983:196).

Project Area Occurrence: Information on project area occurrence of this species is not available at this time. The ferruginous hawk is not included in our copy of the Data Base.

Project Impacts: Information on project impacts is not available at this time.

Endangerment: Information on endangerment is not available at this time.

3.3.2 TRICOLORED BLACKBIRD - Agelaius tricolor

Status: The tricolored blackbird is recognized by the FWS as a Category 2 Candidate species (PAL, December 14, 1990).

Description: The tricolored blackbird is 7-9 1/2 in. long. The male looks like the red-winged blackbird except that it has a much darker red shoulder patch than the redwing, and the shoulder patch is bordered by white instead of yellow. The female tricolored blackbird looks like the female redwing but is darker. The lower part of the breast and the lower back are sooty colored and the streaking on the underparts is obscured (National Geographic Society 1983:420; Terres 1980:937).

Habitat: The tricolored blackbird inhabits open valleys and foothills and may be found in streamside forests, alfalfa and rice fields, marshes, and alongside reservoirs. This blackbird usually nests in marshes but may also nest in willow and blackberry thickets and on the ground in clumps of nettles. They forage in wet meadows, rice and alfalfa fields, and in rangelands. They commonly roost in trees or marshes. Whether they are roosting, foraging or nesting, these birds are always found in very large flocks (National Geographic Society 1983:420; Terres 1980:937).

The blackbird produces two broods each year, laying eggs between April and June. Eggs hatch in about 11 days and the young leave the nest about 13 days after hatching (Terres 1980:937).

About 80% of the tricolored blackbird's diet is animal life. In the summer this mainly includes beetles, caterpillars, and spiders. During the fall and winter weed seeds and grain are an important part of the bird's diet (Terres 1980:937).

Distribution: The tricolored blackbird both nests and winters in interior valleys from southern Oregon (east of the Cascades) to northwest Baja California (National Geographic Society 1983:420; Torres 1980:937).

Project Area Occurrence: There are 14 records of tricolored blackbird presence in the project vicinity (NDDB 1989). These locations are shown in Figure 5. It is possible that this bird is also present in other parts of the project area.

Project Impacts: Analysis of project impacts on the tricolored blackbird is not available at this time.

Endangerment: The population is declining, at least in part, because of drainage of marshes (Torres 1980:938).

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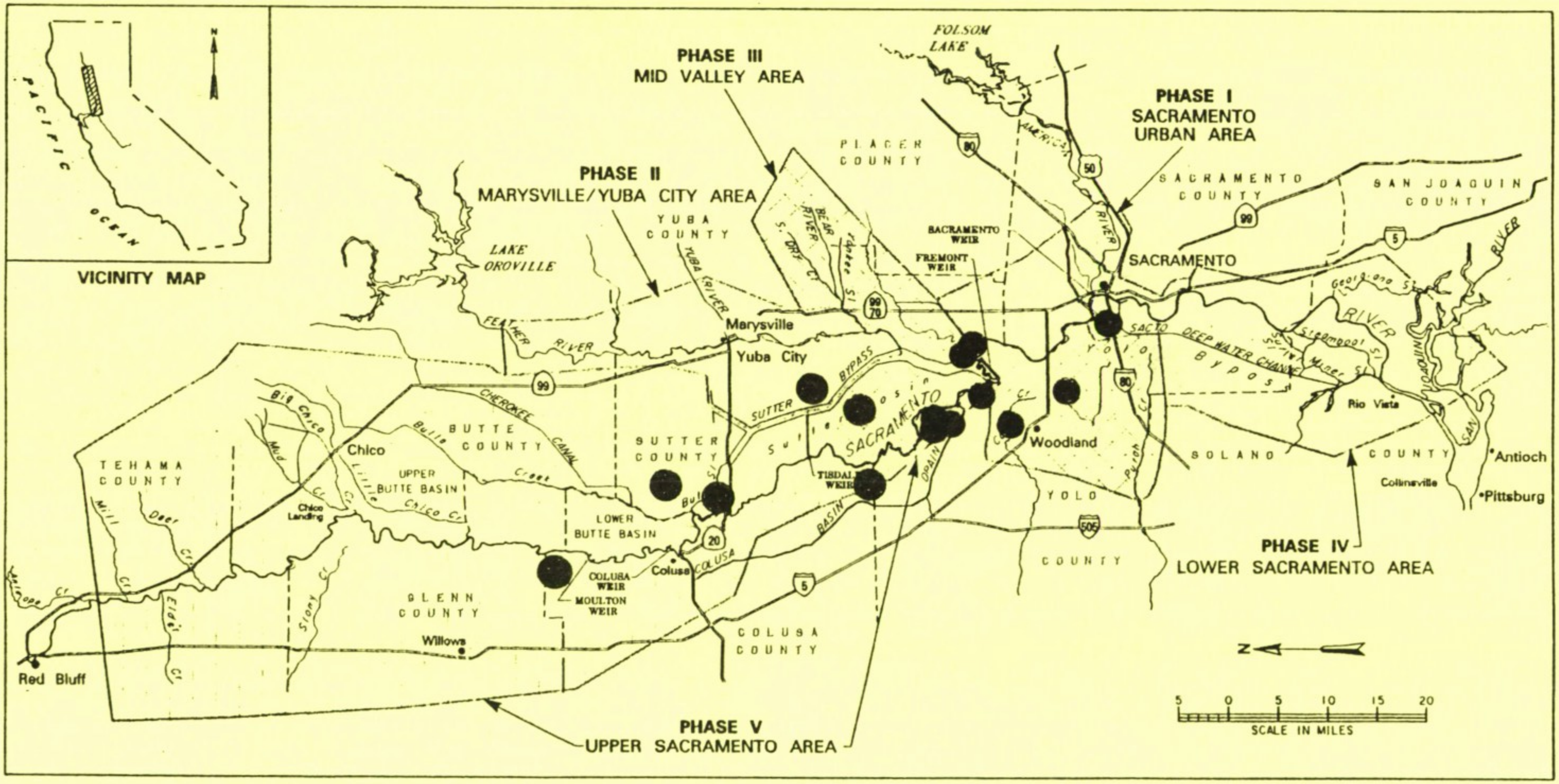
CALIFORNIA



● Tricolored Blackbird

Figure 5 - Tricolored blackbird

(Source: NDDB 1989)

3.3.3 SACRAMENTO SPLITTAIL - Pogonichthys macrolepidotus
Family: Cyprinidae

Status: The Sacramento splittail is a Federal Category 2 Candidate.

Description: The Sacramento splittail can grow up 15.7 in. in length and is easily recognized by the enlarged upper lobe of the tail, small head, and barbels at the corner of its mouth. It is a dull silvery gold on the side and the older the Sacramento splittail the duller its color. Its back is a dusky olive grey in color. During the breeding season the paired and caudal fins are tinged with red-orange and the males become darker in color and develop small white tubercles on the head (Moyle 1976).

Habitat: This species of fish lives mostly in the slow moving stretches of the Sacramento River, Delta and in small shallow sloughs and marshes. They are extremely tolerant of brackish water, unlike other members of the minnow family (Moyle 1976). Their habitat is usually lined with emergent vegetation that offers protection from larger fish and provides abundant sources of food. They are generally bottom feeders and will prey on a variety of organisms depending on the environment. Detritus (loose debris) is a major part of their diet along with anthropods, aquatic insect larvae, and earthworms in flooded areas (Daniels 1983).

The Sacramento splittail is an annual spawner and produces a large number of eggs per year. They are mature by their second winter and live a relatively long life. Spawning occurs between early March and mid-May and is usually associated with an increase in day length and temperature. It is probable that splittail spawn on vegetation (Daniels 1983). In the spring, flooded vegetation is necessary for the young's first month of life (Moyle 1989).

Distribution: Historically, the Sacramento splittail inhabited a wide range of lakes and rivers in the Central Valley, but today they seem to be confined to the lower delta region and the main channel of the Sacramento River. They are, however, the most abundant species of minnow in the area (Daniels 1983).

Project Area Occurrence: It is not known exactly how far up the Sacramento River the splittail occurs, but it is believed to require a tidally influenced habitat. The NDDB (1989) contained no records for the splittail in the project area but it is likely that this fish occurs in some parts of the project area.

Project Impacts: Aquatic resources are not expected to be affected by project activities.

Endangerment: The Sacramento splittail, although abundant within its habitat, occurs within a limited area. Environmental changes caused by the successful introduction of non-native species and the

increased use of water in upstream water projects (as coolant in power plants, for example) may result in the rapid decline of the Sacramento splittail (Daniels 1983).

3.3.4 DELTA SMELT - Hypomesus transpacificus

Status: The delta smelt is recognized by the FWS as a Category 1 Candidate species.

Description: The delta smelt is a small (about three-inches long) translucent fish. All life stages feed only on zooplankton (FWS September, 1990). Studies by Moyle and Herbold (1990?) indicate that postlarval delta smelt feed exclusively on copepods, and adults feed primarily on copepods throughout the year with cladocerans (Daphnia, Bosmina) and opposum shrimp (Neomysis mercedis) being an important seasonal component of their diet.

Habitat: The delta smelt is found in the upper Sacramento-San Joaquin estuary. It inhabits the shallow waters of the seawater-freshwater mixing zone of salt and brackish marshes and estuaries where salinities typically are 0 to 2 parts per thousand. The smelt spawns in Delta channels where most of their larvae is washed into a mixing zone rich in food (Moyle letter 1990).

Distribution: The delta smelt is endemic to the Sacramento-San Joaquin estuary (Herald 1961; FWS September 1990). It is found from the lower reaches of the Sacramento and San Joaquin rivers, through the Delta, and into Suisun Bay (Ganssle 1966; Moyle 1976). Occasionally they are found in Carquinez Strait, San Pablo Bay, and south San Francisco Bay, but the species is much more abundant in the fresher waters of the Delta and Suisun Bay (Ganssle 1966; Messersmith 1966).

Because of increases in salinity, the delta smelt's spawning and larvae nursery areas in Suisun Bay and Suisun Marsh have largely been lost. Delta smelt are now forced to spawn in less favorable river channel habitat (FWS 1990).

Project Area Occurrence: No information on the occurrence of delta smelt in the project are is available at this time. This species is not included in our copy of the NDDB (1989).

Project Impacts: It is unlikely that the delta smelt, if present, would be affected by the project, since construction activities are not expected to take place in the water or at the land-water interface.

Endangerment: Over the past twenty years the population of the delta smelt has declined to about one-tenth of its former size. Poor water quality (largely due to diversion of freshwater from the Delta and partly due to recent drought conditions in central

California) and Delta pumping facilities have been blamed for the decline of the delta smelt in the estuary. Other factors that may contribute to the endangerment of this species include high toxin levels, displacement of native copepods (a major dietary component) by exotics, and competition with an invasive species of clam (Potamocorbula amurensis) (Moyle et al. 1989; FWS 1990).

3.3.5 SAN JOAQUIN POCKET MOUSE - Perognathus inornatus

Status: The San Joaquin pocket mouse is recognized by the FWS as a category 2 Candidate species.

Description: The San Joaquin pocket mouse is about six inches long (Figure 1). Its upper parts are ochraceous-buff to pinkish overlaid with blackish hairs. The lateral line is moderately well marked, the underparts are white, and the tail is faintly bicolored. Characteristics of the head include large mastoids, auditory bullae apposed anteriorly, small and approximately square interparietal, and short nasals, and large coronoid process of mandible. This species is easily confused with perognathus longimembris.

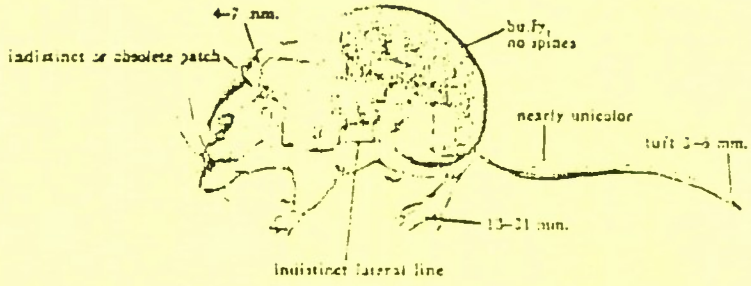
Habitat: The preferred habitat for the San Joaquin pocket mouse is grassy or weedy fine-textured soil in the Lower and Upper Sonoran life zones of the San Joaquin Valley in California. One field survey described suitable habitat as containing "fine silt soils with an overstory of saltbush (Atriplex sp.) and understory of small annual grasses." Marginal habitat was described as "an area with rocky to gravely soils, low brush overstory of brittle brush (Encelia sp.) and dense grasses."

Distribution: The range of the San Joaquin pocket mouse includes most of the Central Valley (Figure 6). Records indicate that this pocket mouse has inhabited the following parts of California: Marysville Buttes, Lodi, Weldon, Walker Basin, Coalinga, Panoche, and Benicia.

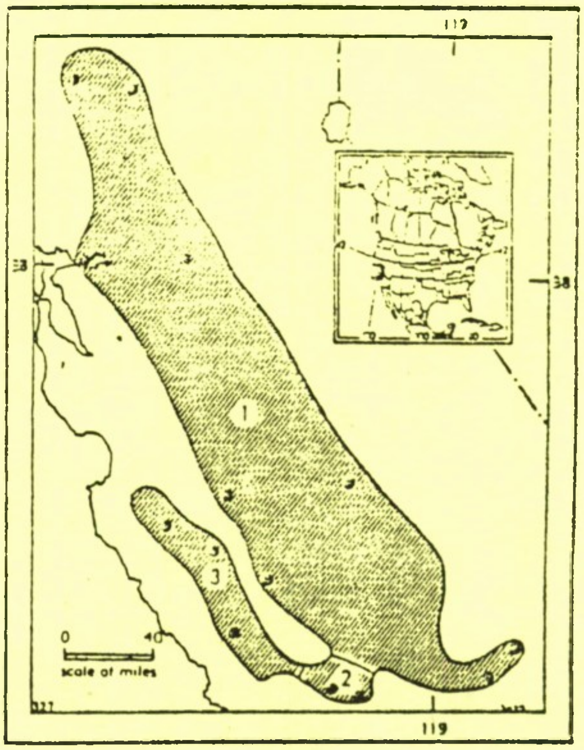
Project Area Occurrence: The NDDB (1989) contains one record of San Joaquin Valley pocket mouse occurence in the project area (Figure 7).

Project Impacts: Information on project impacts on this species is not available at this time.

Endangerment: Threats to the San Joaquin pocket mouse may include loss of habitat and competition with the California pocket mouse.



SAN JOAQUIN POCKET MOUSE



Map 227. *Perognathus inornatus.*

1. *P. i. inornatus* 2. *P. i. neglectus*
3. *P. i. sillimani*

Figure 6 - San Joaquin pocket mouse

SACRAMENTO RIVER FLOOD CONTROL SYSTEM EVALUATION CALIFORNIA

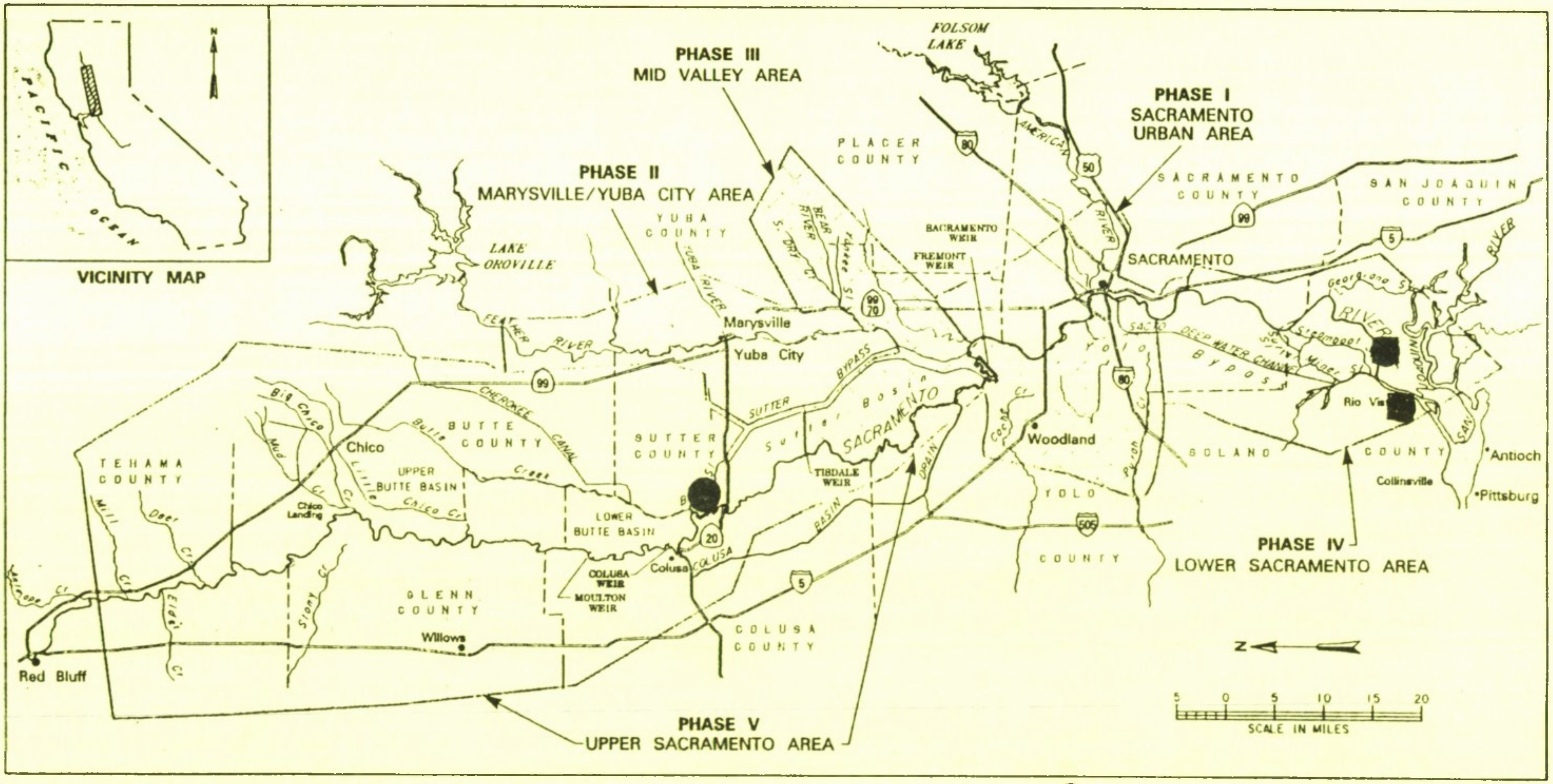


Figure 7 - San Joaquin pocket mouse and Sacramento anthicid beetle

● San Joaquin pocket mouse
■ Sacramento anthicid beetle

(Source: NDDB 1989)

3.3.6 SAN JOAQUIN VALLEY WOODRAT - Neotoma fuscipes riparia

No information is available at this time on the San Joaquin Valley woodrat.

3.3.7 CALIFORNIA TIGER SALAMANDER - Ambystoma tigrinum californiense

Family: Ambystomatidae

Status: The California tiger salamander is a Federal Category 2 Candidate and California Department of Fish and Game species of special concern.

Description: The California tiger salamander is a large stocky salamander from 3-6.5 in. in length. It has small eyes, a broad, rounded snout and tubercles on the underside of its feet. The species has large pale yellow spots on a black background that are scarce or absent along the middle of the back. Southern coastal California individuals may have a few spots and a prominent cream band on the lower sides (Stebbins 1985).

Habitat: The adult California tiger salamander inhabits underground burrows of ground squirrels, badgers, and gophers. This salamander frequents quiet water ponds, reservoirs, lakes, and temperate pools and streams from arid sage brush plains and rolling grasslands to mountain meadows and forests. Adults emerge only for brief periods during nightfall to breed, usually during or shortly after rainfall. Breeding takes place in temporary rain pools, vernal pools and permanent waters of grassland and open woodland of low hills and valleys (Stebbins 1985).

The breeding period is from December to February and the larvae require around 4 months to reach metamorphosis. The larvae diet consists mostly of tadpoles and to a lesser extent snails. The larvae swim very little and feed on whatever passes directly in front of them. When all four legs have developed the larvae make short lunges or dashes at moving objects. Most feeding is done on the bottom, but larger larvae may swim toward the surface to capture prey (Anderson 1968).

Distribution: Historically, the tiger salamander was located in the Central Valley (Figure 8) but was eliminated from much of that region through agricultural and urban developments (Stebbins 1985). Its current range is between the Sierra Nevada and the Coastal Ranges, extending north to Butte County and south to Kern and Tulare Counties. The northernmost record in the Central Valley is in Butte County at the Grey Lodge Wildlife Management Area (Hayes).

This species of salamander has been recorded at sites in the following counties: Tulare, Stanislaus, San Joaquin, Marin, Madera,

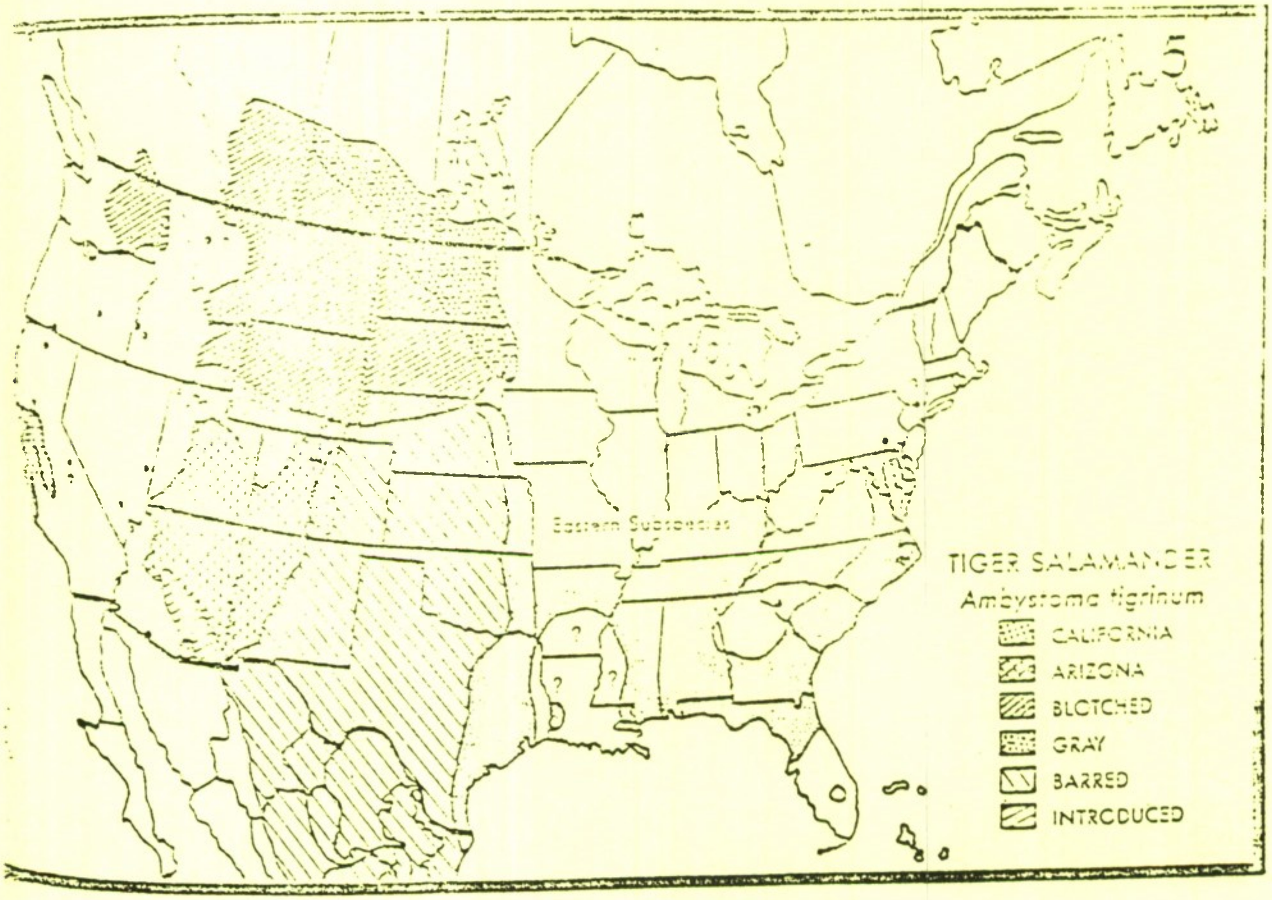


Figure 8 - California tiger salamander

Lake, Kern, Fresno, Contra Costa, Calaveras, Alameda, Sacramento, Butte and Yolo (Hayes).

Project Area Occurrence: The NDDB contains one record of the California tiger salamander presence in the project area (1989).

Project Impacts: Information on project impacts to this salamander is not available at this time.

Endangerment: The California tiger salamander faces endangerment with the continued agricultural and urban development of its habitat. Most existing vernal pools have been altered allowing drainage or connection with semi-permanent canals. This results in permanent water access by introduced species that prey on the Sacramento tiger salamander larvae (centrarchid fish and bullfrogs). Heavy rains can also cause overflow in the pools creating waterways of sufficient depth for fishes to invade the pools and eat nearly all developing larvae. The larvae, because of the energy needed for rapid development, have little or no energy available for predator defenses (Hayes).

3.3.8 CALIFORNIA RED-LEGGED FROG - Rana aurora draytonii
Family: Ranidae

Status: The California red-legged frog is a Category 2 Candidate for Federal listing and is a species of Special Concern to the California Department of Fish and Game.

Description: The California red-legged frog is 1.75-5.25 in. in length with long back legs. Its lower abdomen and underside of its legs are red overlying a yellow background color. Its head is usually dark with a white stripe on the jaw. Its back is dotted with small black flecks and large dark blotches with light centers on a background of brown, grey, olive or reddish brown (Stebbins 1985).

Habitat: This species is a pond frog that inhabits streamsides, grasslands, woodlands, and humid forests. It favors areas where cattails and other plants provide cover. It is most common in lowlands and foothills and usually near a permanent source of water, but may appear far from water in damp woods or meadows after a rainfall (Stebbins 1985).

A short breeding period occurs in the rainy months of January through April lasting 1-2 weeks depending on the locale (Stebbins 1985). Egg masses are laid in a water source on emergent vegetation so that the surface of the egg mass just breaks the surface of the water (Hayes 1984).

Distribution: Historically, the red-legged frog ranged from Northern California south into Baja California and west of the

Cascade-Sierran crest and once included parts of the Central Valley. Currently the species inhabits elevations from near sea level to 8000 ft. in the above mentioned range. However, it is absent from the Central Valley region (Figure 9) and may now be extinct in the southern Sierra Nevada due to habitat destruction and the introduction of the bullfrog (Stebbins 1985).

Current records cite the California red-legged frog in some southern California Counties: Ventura, Orange, Santa Barbara, Riverside, San Diego, San Luis Obispo, Los Angeles, and Montery Counties (CNDDB 1985).

Project Area Occurrence: Our copy of the NDDB does not include the California red-legged frog (1989). No information is available at this time about occurence of this species in the project area.

Project Impacts: No information about possible project impacts to this species is available at this time.

Endangerment: In the late 1800's and early 1900's the red-legged frog was heavily marketed as a source of frog legs. Females of the species were preferred over the males because of the females larger size. As a result, breeding activity was greatly reduced to where the frog populations in the early 1900's were to minimal to record. Introduction of the Bullfrog (R. catesbeiana) to California as an additional source of frog legs added to the decline in R. a. draytonii population due to the competition and predation from the bullfrog (Jennings 1985). Today the California red-legged frog faces endangerment because of habitat destruction such as the draining of wetlands for agriculture and urban development.

3.3.9 GIANT GARTER SNAKE - Thamnophis couchi gigas
Family: Thamnophis

Status: The giant garter snake is a Federal Category 2 Candidate and is listed as threatened with the state of California.

Description: Giant garter snake is one of the largest garter snakes, reaching up to 4.5 ft. in length. It is dull brown in color with a checkered pattern of well separated black spots on the back. It has a dull yellow dorsal stripe and lateral stripes that are not developed. Its head is elongated with a pointed muzzle (DFG 1980).

Habitat: Giant garter snake generally inhabit marshland areas of permanent fresh water and low gradient streams, but will also inhabit temporary water such as sloughs, irrigation canals, drainage ditches, and flooded rice fields. The species has a preference for the slower side sloughs not found along major rivers. Garter snake habitat is void of dense tree canopy and usually contains tule, cattail, blackberry, mustard, various

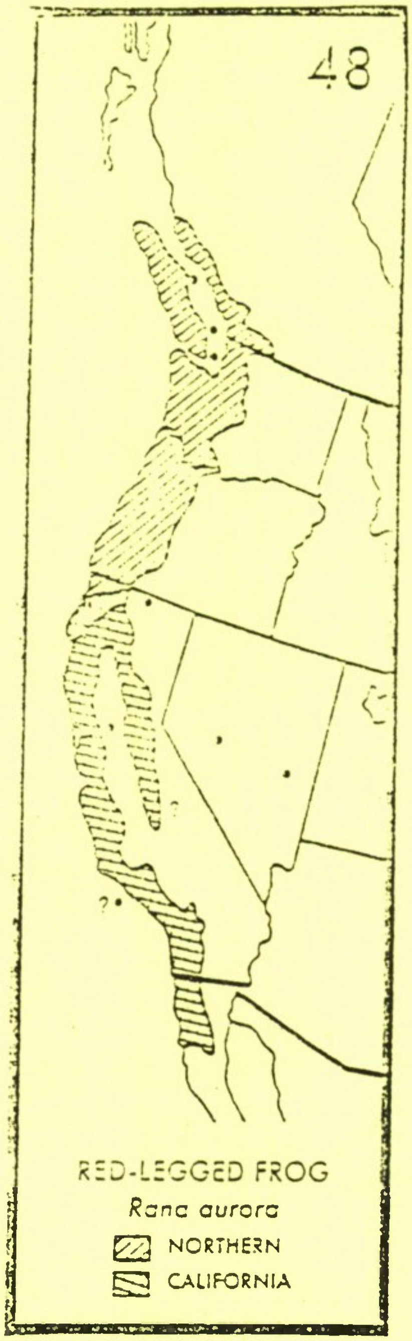


Figure 9- Red-legged frog

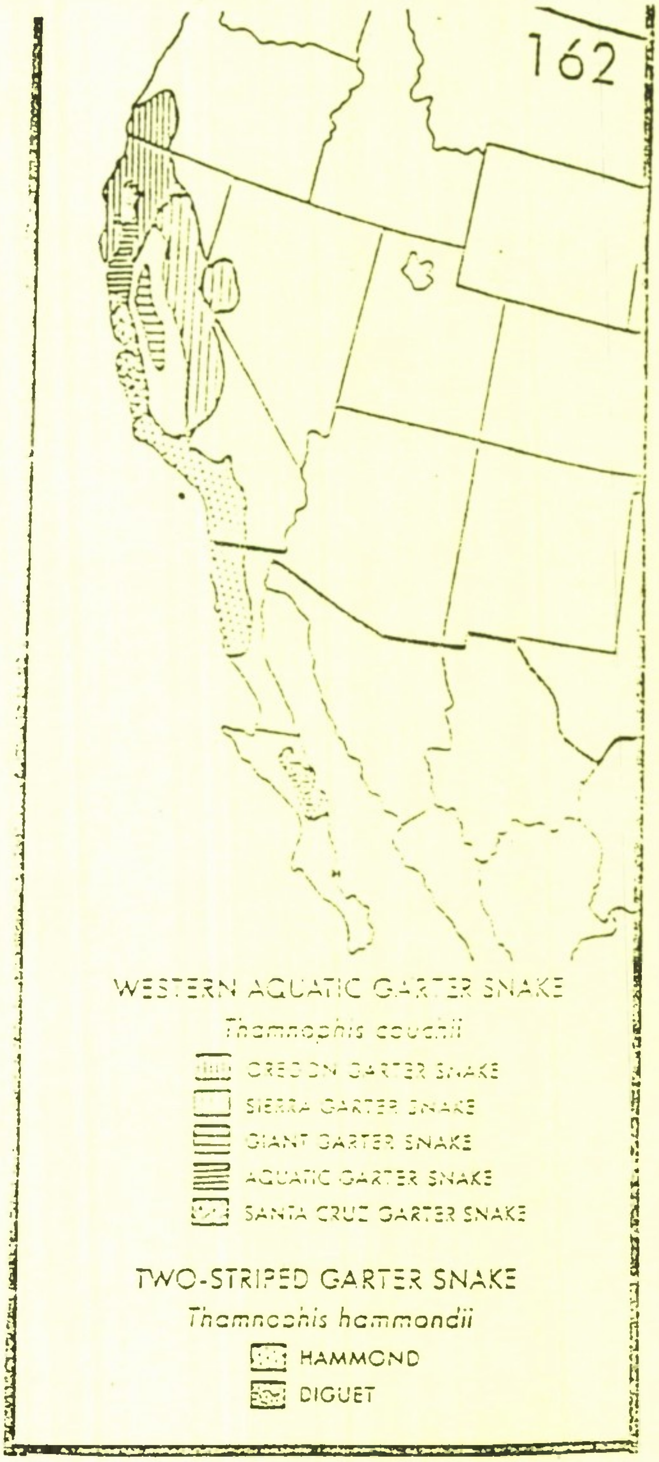
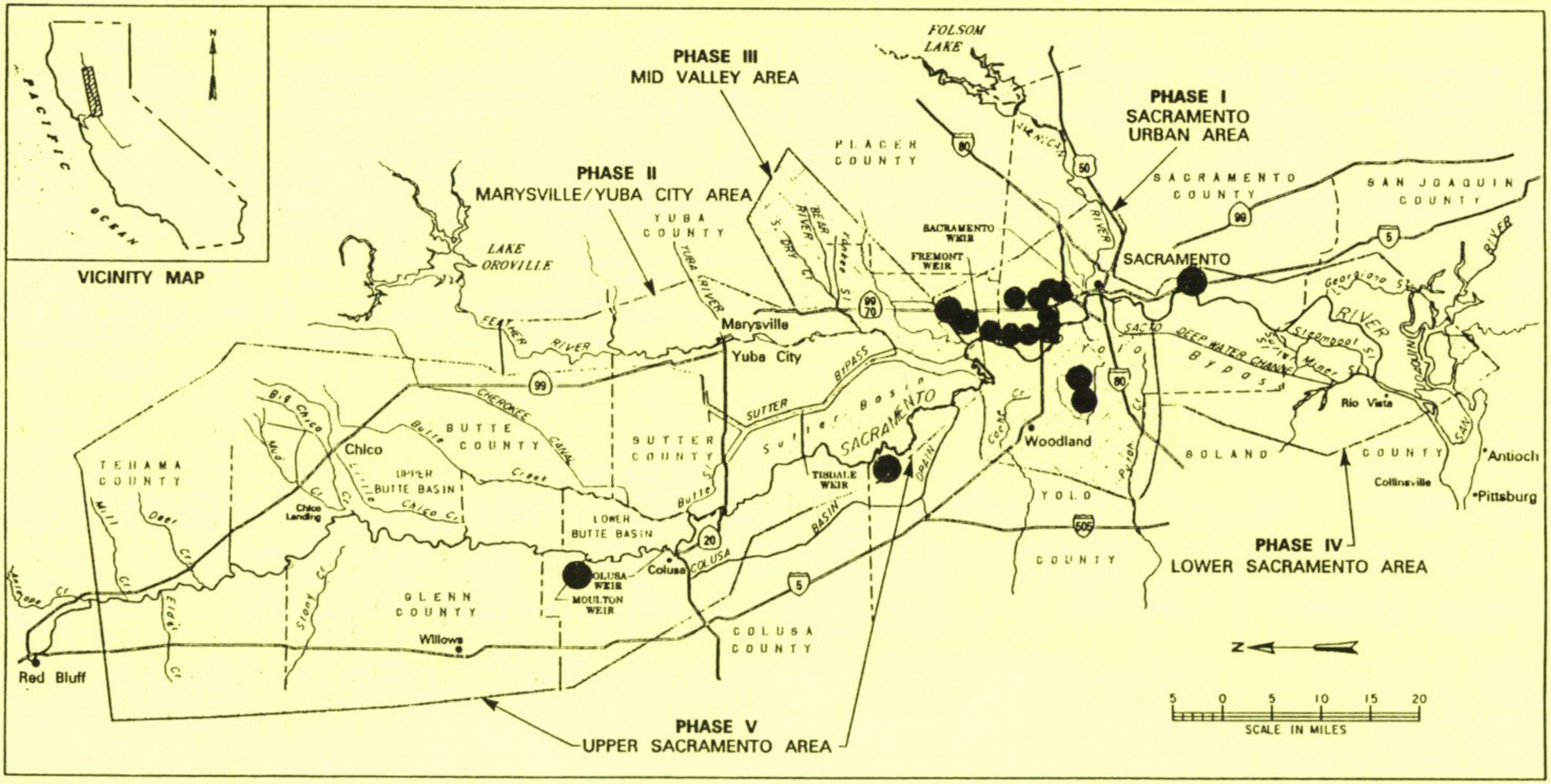


Figure 10 - Giant garter snake

(Source Petersons Guide to Reptiles & Amphibians

SACRAMENTO RIVER FLOOD CONTROL SYSTEM EVALUATION
CALIFORNIA



● Giant garter snake

Figure 11 - Giant garter snake

(Source: NDDB 1989)

thistles and annual and perennial grasses (CNDDB 1986). This vegetation, along with the burrows of rodents and crayfish, provides shelter from predation (Hansen 1986).

Giant garter snake is an aquatic feeder that specializes in ambushing fish underwater. It generally feeds on small fish such as carp (Cyprinus carpio), bullhead (Ictalurus sp.), mosquitofish (Gambusia affinis), and minnows. It will also feed on the larvae and young of the Bullfrog (Rana catesbeiana) (Hansen 1982,1986).

During the active season from March to June, the giant garter snake must bask in sunny expanses of emergent or streamside vegetation in order to raise its body temperature. In the dormant season accessible upland retreats with suitable shelter are necessary during periods of flooding or runoff (Hansen 1986).

Distribution: The historic range of the Giant garter snake was from the Central Valley around Sacramento and Antioch southward to Buena Vista Lake near Bakersfield in Kern County (Hansen 1980).

The giant garter snake currently inhabits marshland around sloughs, irrigation and drainage ditches, canals, streams, and lakes in Fresno, Merced, San Joaquin, Sacramento, Yolo, Butte, Sutter and Solano Counties (Hansen 1986). See Figure 10.

Project Area Occurrence: The present range of the giant garter snake includes the area from the mouth of the Sacramento River in the Sacramento-San Joaquin River Delta up the Sacramento River past Gridely (Figure 11). It is very likely that most or all waterways in this area are frequented by giant garter snake and it should be assumed that the snake is in every ditch in the area (Hansen 1986). The NDDB (1989) contains 24 records of giant garter snake occurrence within the project vicinity.

Project Impacts: Project impacts to this species have not yet been determined.

Endangerment: Giant garter snake faces endangerment from many factors: urbanization, agriculture, the introduction of predator and competitive species, and removal by collectors. Urban development has dramatically changed the snake's habitat through pollution, destruction of its food sources, and conversion to green grass landscapes. Wetlands have been drained and streams have been rerouted through pipes or concrete channels to create sites for urban development and agriculture. Livestock grazing has deleted protective plant cover and compacted the soil resulting in the destruction of underground retreats. The effects of DDT and other pest control chemicals are currently unknown. The introduction of large predatory fish species into almost all permanent freshwater environments has effected giant garter snake by preying on and competing for smaller forage fish (Hansen 1986).

3.3.10 SACRAMENTO VALLEY TIGER BEETLE - Cicindela hirticollis abrupta

Family: Cicindelidae

Status: The Sacramento valley tiger beetle is a Federal Category 2 Candidate.

Description: The Sacramento valley tiger beetle is a relatively new subspecies thought to be derived from C. h. gravida (Graves,1989b). The Sacramento Valley tiger beetle is between 1/3-2/3 in. in length and is a very dark, blackish-brown color. Its characteristics include long and slender legs, long, sickle-shaped mandibles, and head and eyes that together are wider than the thorax (Pearson 1988).

Habitat: This species generally inhabits sandbar deposits along the rivers of the Sacramento Valley in California. The larvae inhabit burrows in the sand which constantly retains moisture near the bottom (Graves 1988). The larvae tunnel is constructed with a funnel at the entrance where the larvae waits for prey to come within striking distance. Both larvae and adult are predators and will prey on a wide variety of arthropods. Adults may also scavenge on dead organisms (Pearson 1988).

Distribution: The Sacramento valley tiger beetle is currently located at three sites in Sutter County: Nicolaus, the Feather River, and the intersection of Highway 99 and the Feather River (Graves 1989a).

Past county records include two locations where single specimens were discovered. The earliest sighting was in 1934 at Davis in Yolo County. The other specimen was unearthed by J.H. Robinson in 1950 in Sacramento County but no specific site data was given (Graves 1989a).

Project Area Occurrence: The NDDB (1989) contains no records of the Sacramento valley tiger beetle occurring within the project area.

Project Impacts: Project impacts to this species have not yet been determined.

Endangerment: C. h. abrupta may face endangerment because of insecticides, agriculture, and alterations of their environment. Studies have shown dramatic declines in the abundant population of C. hirticollis along the Great Lakes because of its extreme sensitivity to human contact (Graves 1989b).

3.3.11 SACRAMENTO ANTHICID BEETLE - Anthicus sacramento

Family: Anthicidae

Status: The Sacramento anthicid beetle is a Category 2 Candidate for Federal listing.

Description: The Sacramento anthicid beetle is a relatively small, flightless, ant-like beetle from 3.18 - 3.63 mm long. Its head and prothorax are reddish in color and its elytra range from a light brick color to a glossy brown-black. Its legs and front shoulders are light brick in color (Chandler 1978). Little is known about the biology of this species but it probably feeds on detritus (loose debris) materials (Chandler 1983).

Habitat: The Sacramento anthicid beetle requires a loose sand habitat. It generally inhabits a slipface among bamboo and willow. Immatures of the species can probably be found under low sprawling plants, debris on the beach, and beneath plant material.

Distribution: This species is currently located at two dune sites in the Sacramento-San Joaquin Delta; (1) Grand Island near Isleton, Sacramento County, and (2) south of Rio Vista, Solano County. These sites are sand dump areas created by the Army Corps of Engineers' dredging of the Delta. It is possible that the Sacramento anthicid beetle may inhabit other areas in the Delta that have not been surveyed for this species (SWMD 1979).

The original habitat of Sacramento anthicid beetle was probably the sand dune area at Antioch. This habitat was eliminated in the 1950's and the beetles probably colonized upstream as the dredging disposal sites were created (Chandler 1980).

Project Area Occurrence: The NDDB (1989) contains two records of Sacramento anthicid beetle occurrence within the project vicinity (Figure 7).

Project Impacts: Project impacts to this species have not yet been determined.

Endangerment: The current use of the sites is adversely effecting the natural habitat of the anthicid beetle, which is essential to its survival. The Rio Vista site is heavily used by off road vehicles and Grand Island is being used as a dump site. The only way to maintain the loose sand areas necessary for the species' survival may be to continue the Corps of Engineers dredging of the Delta area (Chandler 1983).

3.3.12 VERNAL POOL BRANCHINECTA - *Branchinecta lynchi*

No information available at this time.

3.3.13 CALIFORNIA LINDERIELLA - Lineriella occidentalis

No information available at this time.

3.3.14 SUISUN ASTER - Aster chilensis var. lentus
Family - Asteraceae (Sunflower family)

Status: The Suisun aster (or Suisun marsh aster) is recognized by the FWS as a Category 2 Candidate species.

Description: The Suisun aster is a robust, slightly succulent perennial, with erect stems about 3 - 6 1/2 feet tall that are widely branching in the upper portion. The stems and leaves are glabrous or nearly so. The leaves are linear-lanceolate, conspicuous, nearly straight bracts. The heads are few, large, and with 20 - 40 violet to purplish or whitish ray flowers around a central cluster of yellow disk flowers. The ray flowers are about 1/2 - 1 inch long. Flowering time is from June to November (CNPS 1977).

Habitat: The aster grows among tules (Scirpus spp.) in tidal streams and coastal salt marshes and has a narrow adaptation to brackish water. It is most often found in densely vegetated areas in stabilized substrate. Its elevational range is approximately sea level (USACE 1985).

Distribution: The Suisun aster is recorded as historically occurring in Contra Costa, San Joaquin, Solano, Napa, and Sacramento Counties (CNPS 1988). The aster is currently found in the region from Suisun Marsh east to Jersey Island on the San Joaquin River and southeast to the Discovery Bay Area (USACE 1987). Recent sightings of the plant are mostly in the marshes around San Pablo Bay, the Suisun Marsh, and as far upstream as Toland's Landing just south of Rio Vista in Solano County, and along the san Joaquin River on Hog Island, although none were found in the surveys done in 1985. Other sightings have been recorded in Contra Costa County on Brown's Island; in sacramento County on Chain Island, and in Solano County in Barker Slough (USACE 1985).

Occurrence in Project Area: The NDDB (1989) reports one occurrence of the Suisun marsh aster within the project area (Figure 12).

Project Impacts: Project impacts to this species have not yet been determined.

Endangerment: Threats to the Suisun aster come from land fills, drainage of marsh habitat, pollution, and changes in salinity level (CNPS 1977). It is not widely distributed and it appears to be restricted to brackish waters. The narrow adaptation to brackish water in addition to historic destruction of tidally influenced

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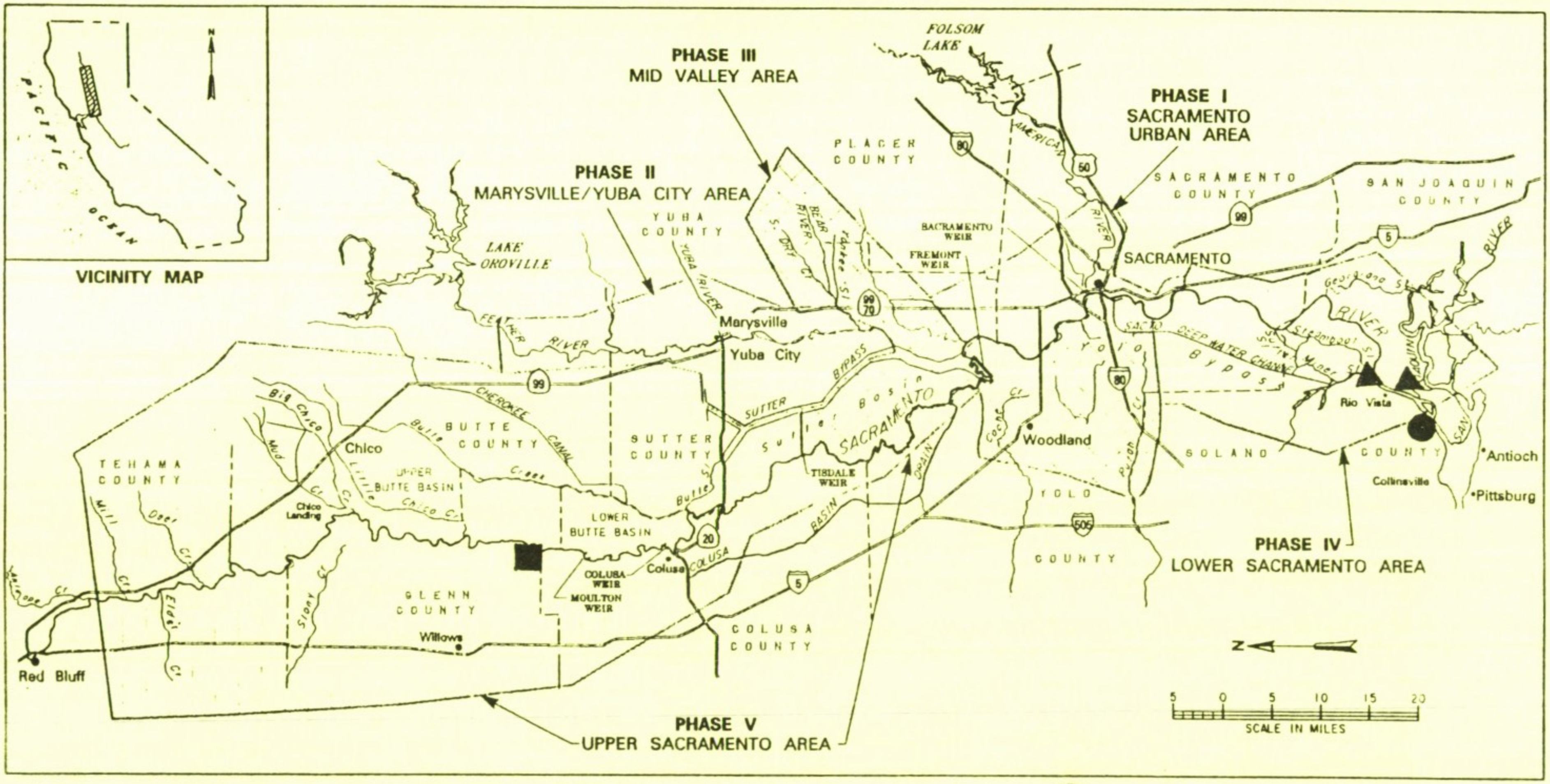


Figure 12 - Suisun marsh aster

(Source NDDB 1989)

freshwater habitats may be the reason for decline in the aster's numbers (USACE 1985).

3.3.15 HEART-SCALE - Atriplex cordulata
Family: Chenopodiaceae

Status: Heart-scale has been recommended for Category 2 status by the FWS (February 1990).

Description: Heart-scale is an annual which reaches about 15-35 cm. high. The branches are stout, spreading or ascending, covered with bran-like scales and straw-colored. Leaves are numerous, sessile, broadly cordate-ovate, 5-10 cm. long acute or obtuse at the apex, clasping at the base, entire, white-furtivaceous and firm. The staminate and pistillate flowers are mixed in small axillary clusters. Fruiting bracts are sessile or subsessile, ovate-orbicular, 3 mm. long, compressed, acute at apex, united to the middle, deeply and acutely dentate, the sides slightly tuberculate or smooth. Flowers from May to October (Munz and Keck 1986:68).

Habitat: Heart-scale prefers hard, trampled, somewhat alkaline soils. It is found in valley grassland communities (Munz and Keck 1973:68).

Distribution: Heart-scale occurs in the Sacramento and San Joaquin valleys.

Project Area Occurrence: The NDDB (1989) contains no records of heart-scale occurrence in the project vicinity.

Project Impacts: Project impacts to this species have not yet been determined.

Endangerment: No information on endangerment is available at this time.

3.3.16 CALIFORNIA HIBISCUS - Hibiscus californicus
Family: Malvaceae

Status: The California hibiscus is a Federal Category 2 Candidate. It has no listing with the State of California. The CNPS categorizes this plant on it's 1B List giving it an R-E-D code of 2-2-3; occurrence confined to several populations or to one extended population; endangered in a portion of its range; and endemic to California (CNPS 1988).

Description: California hibiscus is a tall herbaceous perennial that grows each year from a rootstock. It has stout erect stems 3.3 - 10.0 ft. tall that can form a relatively robust bush. It has

large, heart-shaped leaf blades (2.4 - 3.9 in. long), with toothed margins and large (3.1 - 6.3 in.), white (or pinkish, or pale lemon-yellow), 5 petaled flowers with a deep, red center. The stamens are in an elongated column. The stem and herbage have a velvety pubescence. Flowering time is August to September (CNPS 1977, USACE 1986). This species can be identified all year round.

Habitat: This species is found on undisturbed riverbanks saturated with freshwater and on low peat islands in sloughs. It also typically occurs along quiet backwaters with emergent marsh vegetation such as along oxbows, irrigation canals, and related wetlands. Populations are not known to occur in river channels with strong currents, intense flood forces, or steep banks. It is often found growing in association with tules (Scirpus spp.) and cattails (Typha spp.) on low inundated island edges of the San Joaquin portion of the Delta and along gradually sloped undeveloped moist riverbanks and backwaters of the Sacramento River. A 1981 survey of the Delta found most hibiscus growing in densely vegetated undisturbed riverbank areas in association with willows, Fremont cottonwood, blackberry, and other freshwater marsh species (USACE 1986,1987). It is believed that survival of this species may be dependent upon a certain fresh/slight-salt water mixture from the freshwater rivers and water from the San Francisco Bay (CNPS 1977). The plant's elevational range is from 0 to 50ft.

Distribution: California hibiscus was once common throughout the fresher water areas of the Sacramento-San Joaquin Delta, and along the Sacramento River from approximately the Chico/Red Bluff region downstream to the upper San Joaquin Delta (USACE 1986).

Distribution today is limited to locations around the lower portions of the Sacramento and San Joaquin Rivers from Contra Costa and San Joaquin Counties north to Butte and Glenn Counties, encompassing Colusa, Sacramento, Sutter, and Solano Counties (CNPS 1988, USACE 1986). See Figure 13.

Project Area Occurrence: Known locations for the California hibiscus include the Butte Basin area, along Butte Creek, Howard Slough east of Princeton, Eddy Lake in the Llano Seco area, and along the Sacramento River near Rio Vista (CNDDB 1986). The California hibiscus also occupies the Yolo By-Pass, on the north side of Old River, just north of the Sutter/Yolo County line (CNDDB 1989). This occurrence, although within the project boundaries, is located outside of the proposed construction locations. It is possible that this species exists elsewhere in the project area since it is known to occur along many parts of the Sacramento River. The NDDB (1989) contains 9 records of California hibiscus occurrence in the project area (Figure 14). This plant is known to occupy several sites adjacent to the project area.

Marsh and swampland habitat is very abundant along the slough of lower Butte Creek, farther south along the Sacramento River, and

on the delta islands of the San Joaquin and Sacramento Rivers (Mason 1957).

Project Impacts: It is likely that some California hibiscus may be disturbed by construction operations but full analysis has not yet been completed.

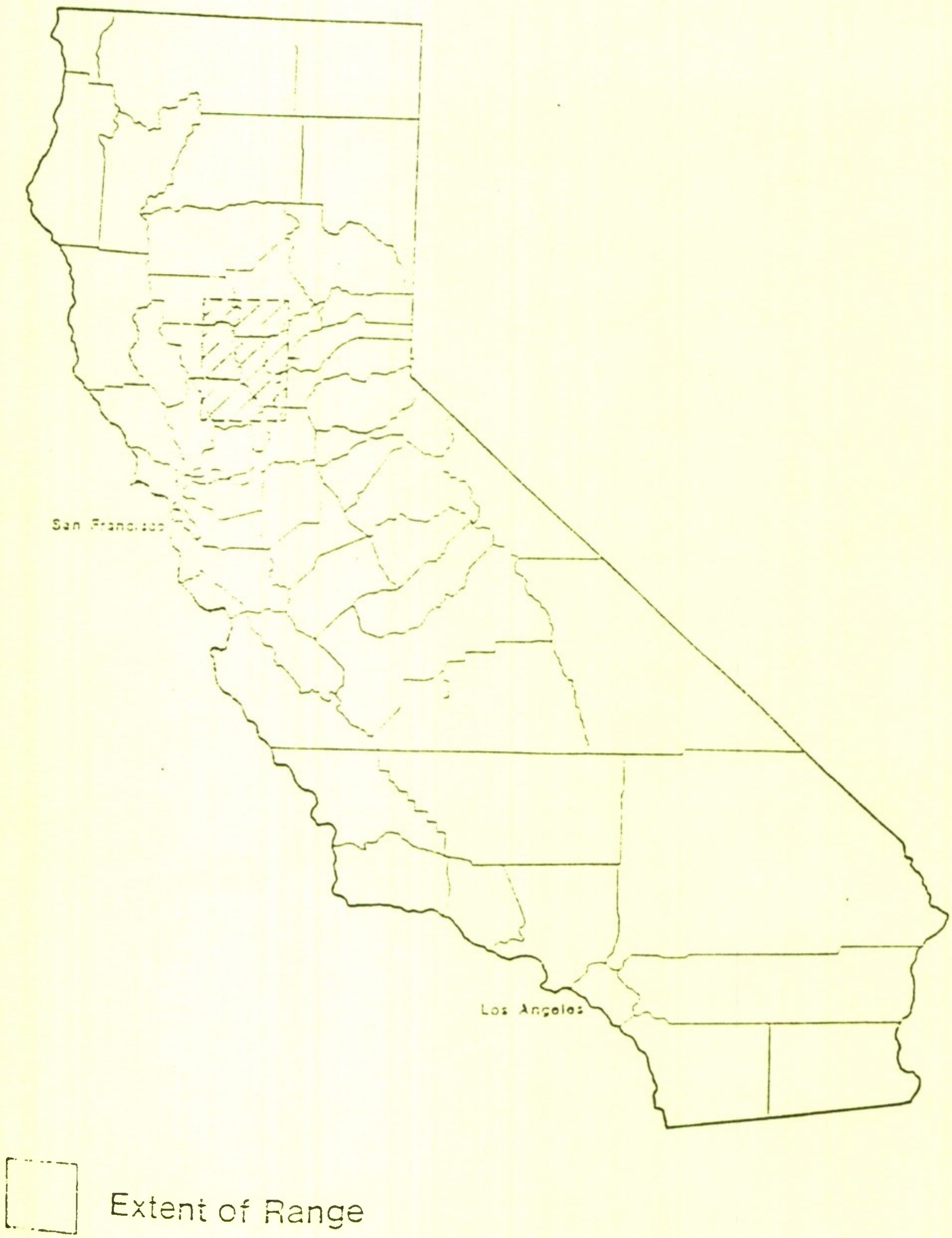
Endangerment: The California hibiscus has been eliminated from many sites within its historic range. Habitat alteration by public works improvement projects such as flood control, erosion control, and weed eradication has played a large role in this elimination. Levee construction and ongoing operation and maintenance along the Sacramento and San Joaquin Rivers have destroyed much of the plant's habitat along riverbanks. Similarly, marsh reclamation and agricultural development have altered or eliminated much of the backwater and high marsh habitat (USACE 1986).

3.3.17 DELTA TULE PEA - Lathyrus jepsonii ssp. jepsonii
Family: Fabaceae - pea family

Status: The Delta tule pea is a Federal Category 2 Candidate species. The State of California does not list the Delta tule pea and the Smithsonian Institute records it as endangered, but not protected (USACE 1985). The CNPS inventories the species on list 1B with an R-E-D code of 2-2-3: occurrence confined to several populations or to one extended population; endangered in a portion of its range; and endemic to California (CNPS 1988).

Description: The Delta tule pea is a vine-like perennial herb that typically grows at the waters edge. It produces several stems, up to 6 ft. long, from underground rootstocks. These stems are semi-erect or prostrate, sometimes growing in tangled masses (3.5 - 8 ft. tall) and have broadly winged margins along the internode stem sections giving a flattened appearance. The pea can grow individually and often clambers over other plants. The leaves are compound with 10 - 14 lance-like to semi-elliptical leaflets, a terminal tendril, and small stipules. The inflorescence is a raceme with 10 - 20 pale pink to crimson flowers, .79 in. long. The fruit is a pea pod 1.97 - 3.54 in. long. Delta tule pea flowers between April and June, sometimes remaining until August. All the plant parts are glabrous (hairless) in the subspecies jepsonii (USACE 1985).

Glabrous individuals collected in Tulare, Fresno, and San Joaquin counties have been referred to as both subspecies jepsonii and as glabrous variants of subspecies californicus. Questions have been raised as to the taxonomic validity of separating the two subspecies jepsonii and californicus. Several mixed populations of both have been reported. Subspecies jepsonii is distinguished from californicus by leaflets that are glabrous to subglabrous (USACE 1986).

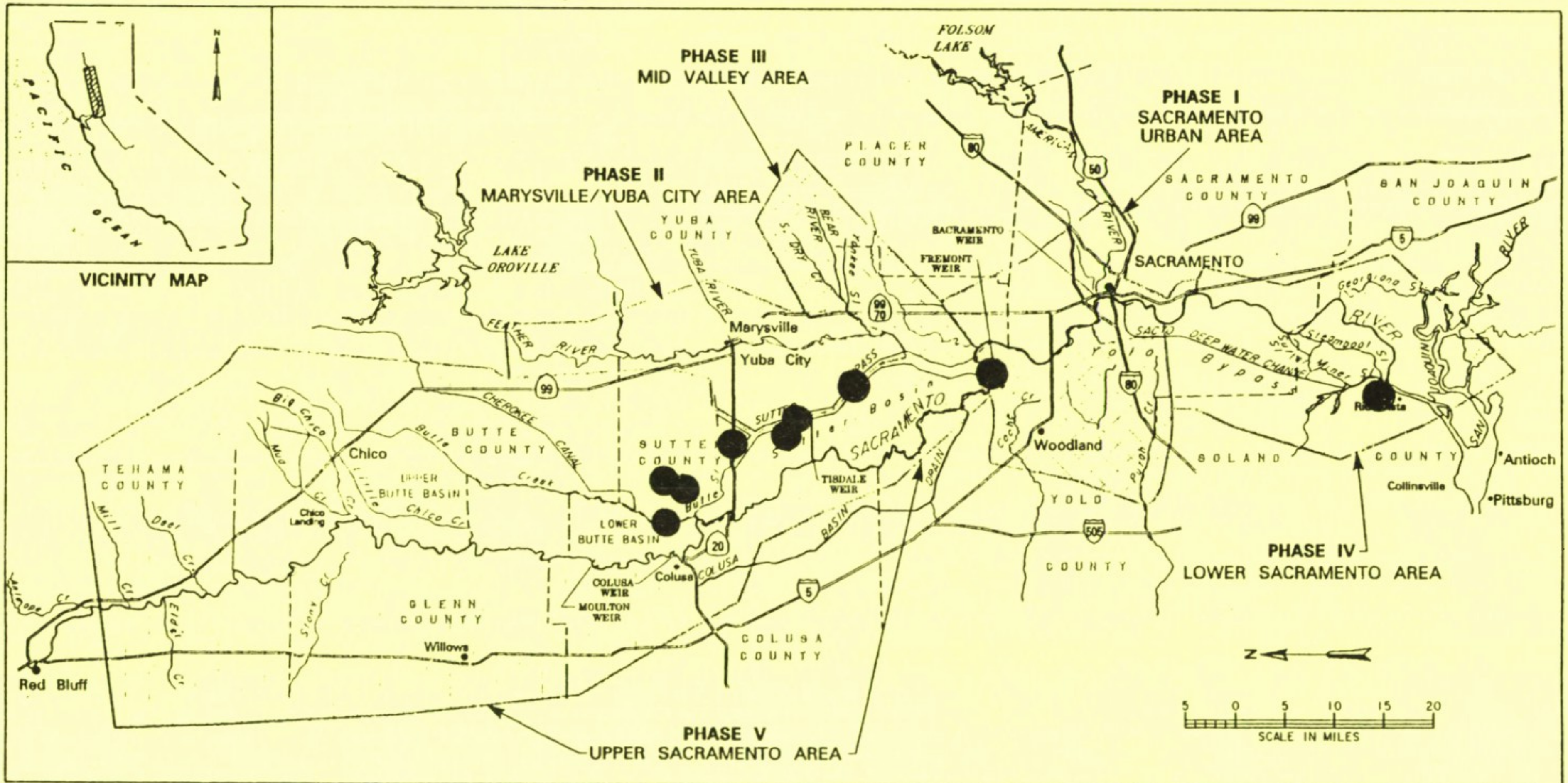


Known Range of California Hibiscus

FIGURE 13 - California hibiscus

Figure 3-4

SACRAMENTO RIVER FLOOD CONTROL SYSTEM EVALUATION
CALIFORNIA



● California hibiscus

Figure 14: California hibiscus

(Source: NDDB 1989)

Habitat: Delta tule pea is found in large colonies on drier ground adjacent to marshlands, or in tidally influenced brackish or freshwater wetlands including tule marshes, muddy riverbanks, and sloughs. Typically it is found along the water's edge climbing up tall emergent plants such as tule (Scirpus acutus, S. californicus) and cattails (Typha spp.) at an elevation between 0 and 20 ft. The plant is usually found in association with soft bird's beak (Cordylanthus mollis), horsetail (Equisetum ssp.), wildgrape (Vitus californicus), and white alder (Alnus rhombifolia), and is occasionally found along older, vegetated riprapped bank habitat (USACE 1980, 1985, 1986).

Distribution: The pea is recorded as historically occurring in Alameda, Contra Costa, Fresno, Napa, San Benito, Santa Clara, Solano, and San Joaquin counties (CNPS 1988). The plant has been found from the Napa River east through Suisun Marshes to Stockton and north to Brannan Island in Sacramento County. Sightings have been made in the past on Mare Island, Suisun Marsh, Antioch north, Rio Vista, Bouldin Island, and Honker Bay. This species is thought to potentially occur as far upstream as Walnut Grove along the Sacramento River and within Steamboat Slough at the tip of Grand Island (within the Sacramento River system) (USACE 1985).

Delta tule pea is found primarily in the Suisun Marshes above San Pablo Bay and at the south end of the San Francisco Bay, and from the Sacramento-San Joaquin River Delta south and south east to the San Joaquin Valley and southern Sierra Nevada (USACE 1980, 1985, 1986).

Project Area Occurrence: The Delta tule pea is known to occur in the Delta in Snodgrass Slough, Steamboat Slough, and on Brannan Island (CNDDB 1989). See Figure 12 for known locations within the project area.

Project Impacts: Project impacts to this plant have not yet been evaluated.

Endangerment: The total population of delta tule pea has declined from historic levels due to changes in water quality and the extensive diking and draining of wetlands in the Delta (USACE 1986).

3.3.18 MASON'S LILAEOPSIS - Lilaeopsis masonii

Mudflat Quill Plant

Family: Apiaceae - carrot family

Status: Mason's lilaeopsis is a Category 2 Candidate for Federal listing and the State of California lists it as rare. The plant is inventoried on the CNPS 1B list having an R-E-D code of 2-2-3; confined to several populations; endangered in a portion of its

range; and endemic to California (CNPS 1988). The Smithsonian Institute presumed the plant to be extinct prior to 1974, but it was rediscovered in 1977 (USACE 1985).

Description: Mason's lilaeopsis is a low, hairless, perennial plant that spreads by rhizomes and forms low bright green sod mats on wave cut benches along fresh water channel banks. The leaves are quill shaped, cylindrical, .59 - 2.8 in. long and less than .039 in. in diameter with few and obscure transverse septae. The pendunciles are long and weak, mostly shorter than the leaves. The inflorescence is an umbel on a weak stalk with 3 - 8 tiny white flowers. The pedicels, or flower stalks, are ascending to variously bent. The fruits are small (.060 - .071 in. long, .049 - .060 in. broad) with low and corky-thickened ribs. Lilaeopsis flowers from May to August and can usually be found in both flower and fruit from June to November (USACE 1985).

Limosella subulata superficially resembles Mason's lilaeopsis and is found closely associated with it, sometimes growing in the same populations. The leaves are so similar on the two species that it is impossible to tell them apart in the field unless they are flowering. The Limosella subulata has a simple flower and no umbel inflorescence. Lilaeopsis' relative, the coastal Lilaeopsis occidentalis has stouter leaves without the obscure transverse septae (USACE 1985). The elevational range of Mason's lilaeopsis is from 0 - 25 ft.

Habitat: Mason's lilaeopsis requires tidally inundated habitats with emergent marsh vegetation and specific types of rooting substrate. It tends to form a sod at the margin of the water where it is frequently inundated by waves and tidal fluctuation. It grows on low wave-cut banks and on downed logs and wooden structures, primarily in brackish waters, but also can occur in freshwater marshes and rivers. The plant generally grows in soil high in clay, on stable shoreline mudflats, on semi-stabilized substrate such as partially buried logs with debris and soil deposited in cracks, and on clay deposits over sandy substrate (USACE 1985).

The plant is so diminutive that it is easily overlooked. It is found in association with the marsh pennywort (Hydrocotyl verticillata), bulrush (Scirpus koilolepsis), arrow grass (Triglochin striata), and the Suisun aster (Aster chilensis var. entus) (USACE 1985).

Distribution: Past records on the plant are few and the historic range is not well known (USACE 1985). The lilaeopsis is listed as historically occurring in Contra Costa, Napa, Sacramento, San Joaquin, and Solano counties (CNPS 1988).

The lilaeopsis' known distribution extends from the margins of the Napa River, Napa County east to the channels and sloughs of the

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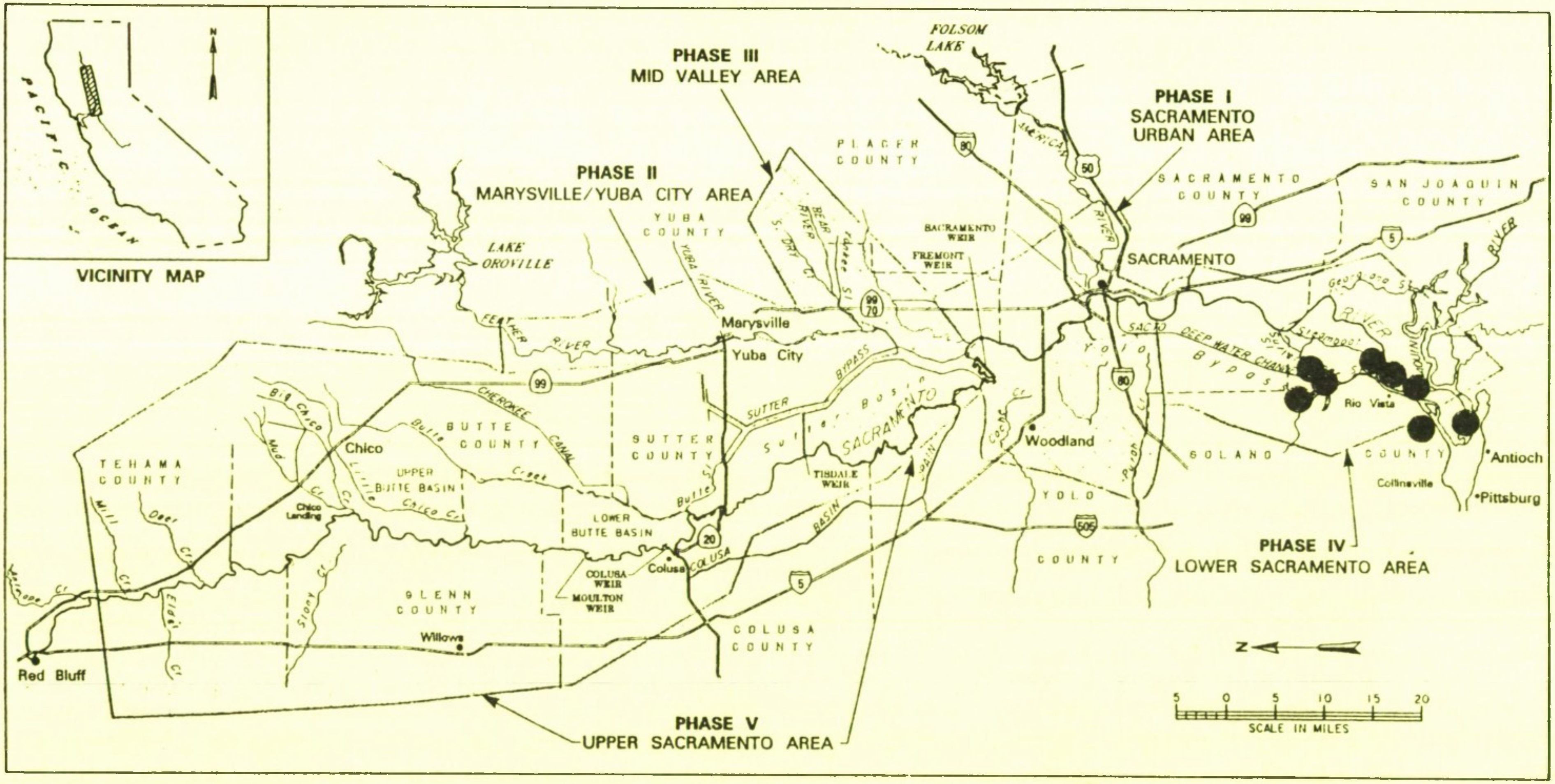

● Mason's lilaeopsis

Figure 15 - Mason's lilaeopsis

(Source: NDDB 1989)

Sacramento-San Joaquin Delta in Contra Costa, Solano, Sacramento, Yolo, and San Joaquin counties. In all there are about 30 known occurrences of Mason's lilaeopsis (CDFG 1989).

Project Area Occurrence: This species is likely to occur within the project vicinity particularly close to the mouth of the delta (Figure 15). It is found in the Delta in Rio Vista, on Brannan Island, and in Cache and Steamboat Sloughs where wave and tidal inundation occurs (CNDDB 1989).

Project Impacts: Potential project impacts to this species have not yet been determined.

Endangerment: The Mason's lilaeopsis is threatened by Delta flood control projects, the widening of Delta channels, dredging and dumping of soils, recreation development, and water quality changes from decreased flows in the Delta.

3.3.19 LITTLE MOUSETAIL - Myosurus minimus ssp. apus
Family: Ranunculaceae

Status: Little mousetail is recognized as a category 2 Candidate species by the FWS (February 13, 1990).

Description: Little mousetail is a small tufted annual with fibrous roots. Leaves are basal, entire, linear-filiform, and 2-8 cm long. Scapes are shorter than or rarely equaling the leaves. Flowers are minute, greenish-yellow to whitish, solitary on naked scapes. Sepals 5, sometimes 6-7, 2-3 mm long, faintly 3-5 nerved, spurred at base spurs 1-3 mm. long. Petals linear, 2-3 mm. long, of same number if present, greenish-yellow, each with a nectar-bearing pit at summit of claw. Carpel-spike 1-5 cm. long, 2-3 mm. thick at base. Stamens 5-15. Pistals many, on a cylindrical axis. Flowers March - June (Munz and Keck 1968:80). The fruiting receptacle elongates and looks like a mouse's tail (Sorrie 1990:104; Garnock-Jones 1986:351). Sorrie (1990:103) mentions that there has been some confusion in the literature about flower color, morphology, and presence of petals. He also describes the species as winter annuals (Sorrie 1990:103).

Habitat: The little mousetail inhabits moist places such as vernal pools, generally below 2500 ft. (Munz and Deck 1968:80). It has a preference for clayey, neutral to alkaline soils (Sorrie 1990:103). It is primarily found in valley grassland, chaparral, and north oak woodland plant communities (Munz and Keck 1968:80). The species may also be found on or near limestone outcrops, in fallow fields and roadside depressions (Sorrie 1990:103).

Distribution: Historically, the little mousetail (species) was found largely on moist flats on nearly all continents (Garnock-Jones 1986:351). Currently it occurs from San Diego county to

Siskiyou and Modoc counties in California. It is also found in British Columbia, along the Atlantic coast, and Eurasia (Munz and Keck 1973:80).

Project Area Occurrence: The FWS has indicated that this species may occur within the general project vicinity. A search of the NDDB showed no records of little mousetail within the project area. Further investigation and field surveys will be necessary to determine actual occurrence of the plant within the project area.

Project Impacts: It is not possible to determine project impacts at this time.

Endangerment: It is likely that the little mousetail is endangered because of loss of habitat due, at least in part, to conversion to agriculture and urban development.

3.3.20 COLUSA GRASS - Neostapfia colusana
Family: Poaceae

Status: Colusa grass is a federal category 2 species (FWS December 14, 1991) and is also listed as endangered by the State of California (California Native Plant Society 1986).

Description: Colusa grass is an annual plant with lower stem bases reclining on the ground and with the upper portion erect. Stems 7-30 cm high with pale green leaves loosely folded around the stem, consecutive leaves emerge from the sheath of the former leaf. Pale green flowers are arranged in thick, spike-like, compound inflorecences which often have a thin, stringy flowerless apical appendage. Each spikelet contains five florets and lack glumes; lemmas very broad, fan-like with many veins and hairy-fringed margins. Anthers rose-colored. Flowers from May to June. Both Colusa grass and Orcuttia exude a sticky, aromatic substance at maturity which hardens into brownish masses. Colusa grass can be distinguished from Orcuttia and other grasses with similar growth habits by its lack of differentiation of the leaf into blade and sheath (California Department of Fish and Game 1986; Munz and Keck 1968:1500).

Habitat: Colusa grass occurs predominately on the adobe muds of large or deep vernal pools, but also inhabits the alkali banks of intermittent streams common to Central Valley grassland communities of California (elevation 18-360 feet). Its preferred habitat is vernal pools and although the best occurrences of Colusa grass occur mostly in the absence of other vegetation, it can be associated with other valley vernal pool species. Commonly it occurs with the San Joaquin Valley Orcutt grass (Orcuttia inaequalis), or with hairy Orcutt grass (O. pilosa). Colusa grass may also be found in close proximity, but seldom intermingled with, Hoover's spurge (Chamaesyce hooveri), woolly-heads (Psilocarphus

spp.), popcorn flower (Plagiobothrys spp.), Vasey's coyote-thistle (Eryngium vaseyi), downingia (Downingia spp.) and salt grass (Distichlis spicata). This grass requires dry summers in order to complete its reproductive cycle.

Distribution: Colusa grass was once abundant in the lowest foothill "gooseland" vernal pools of Colusa and Stanislaus Counties. Today its distribution is restricted to scattered vernal pools in Stanislaus and Merced counties and one large vernal lake (Olcott Lake on the Jepson Prairie) in Solano County.

Project Area Occurrence: The NDDB (1989) contained one record of Colusa grass occurence in the project vicinity (Figure 12). Field surveys of sites identified as suitable habitat for this plant will need to be surveyed. Particular attention should be given to Colusa county, which is within the historic range of Colusa grass, and to Solano county, where Colusa grass is known to occur at Olcott Lake on Jepson Prairie.

Project Impacts: Insufficient information is available at this time to evaluate project impacts on Colusa grass.

Endangerment: Conversion of habitat to agriculture or grazing is the primary reason for the decline of Colusa grass. Flood control work and use of vernal pool depressions for summer water sumps also threaten this species.

4.0 SUMMARY AND RECOMMENDATIONS

4.1 OVERVIEW

Of the five Federally listed species, two are known to occur within the project area (winter-run chinook salmon and the valley elderberry longhorn beetle), one is highly likely to be present within in the project area during some parts of the year (bald eagle), one may be found within the project area during some parts of the year (American peregrine falcon), and the likelihood of encountering the palmate-bracted bird's beak is uncertain.

4.2 IMPACTS OF PROPOSED ALTERNATIVES

The possible impacts of each of the proposed project alternatives on the Federally listed species are discussed below. In all cases construction landing sites and access routes may require vegetation and/or soils removal. Evaluation of the possible impacts of project alternatives on Candidate species is still in progress and will be provided in the supplemental environmental documents for each of the project Phases. Site specific information and field data will be required for each Phase of the proposed project in order to confirm or expand upon the general analysis presented here. The location and conditions of

both barrow and spoils sites will be addressed in the supplemental documents provided for each of the project Phases.

1. No Action. Under this option current conditions will remain unchanged and therefore no immediate impact upon listed species is expected. If severe levee failure were to occur at some future date it is possible that existing vegetation, such as elderberry shrubs (host to the VELB), trees/snags (perching habitat for the bald eagle), and the palmate bird's beak (if it is present in the vicinity) would be damaged or completely removed by flood waters and erosion. Water quality might be reduced (affecting fisheries, including winter-run chinook salmon) both as an immediate result of levee failure and as a result of the more extensive levee reconstruction work that would be required subsequent to large-scale failure of the levee system.

2. Construct Drainage Improvements at or Near the Landward Toe of the Levee Embankment. This alternative will disrupt vegetation in the immediate construction area and therefore may affect the VELB in locations where elderberry shrubs are destroyed or damaged. Trees or snags which provide perching habitat for resident and migrating birds, including the bald eagle, may need to be removed. Construction activities and noise may temporarily deter bald eagles from visiting the area within and around these activities. This alternative is not expected to affect winter-run chinook salmon since the construction activities will take place on the landward side of the levees.

3. Raise Levees. This option will require removal of vegetation from the top and landward sides of the levee. Some plants will probably also be removed from the waterward side of the levee. In some areas this removal may include elderberry shrubs (host to VELB), trees or snags (perching habitat for the bald eagle), and possibly the palmate bird's-beak. Safeguards will be employed to prevent construction materials from entering the water and no impact to fisheries or the winter-run chinook salmon is anticipated.

4. Raise Levees and Construct Drainage Improvements at or Near the Landward Toe of the Levee Embankment. Impacts to listed species under this option are expected to be the same as (2) and (3) above.

5. Construct a Cutoff Wall. Application of this option will require the removal of vegetation and soils from the top of the levee and from any construction landings. Since the top of the levee is generally maintained free of vegetation, elderberries (host to the VELB) will not be affected. The palmate bird's-beak is not expected to be present on the upper part of the levees. Both of these plants could be affected by placement of construction landings and staging areas. Plants on the landward side of the levee may be adversely affected by decreased access to water caused

by the impermeable cutoff wall.

6. Construct Drainage Improvements and Stabilizing Berm at Landside Levee Toe. Impacts to listed species under this option would be similar to that experienced under option (2).

4.3 CONCLUSION AND RECOMMENDATIONS

The VELB is the federally listed species most likely to be affected by reconstruction of levees within the Sacramento River systems area due to damage to or removal of elderberries. Detailed surveys of the VELB host plant, elderberry, will be completed and mitigation undertaken according to the most current FWS guidelines and with full coordination with the Service.

The palmate bird's-beak is a rare plant tolerating a very narrow range of environmental conditions. It is not reported as occurring within the project area but extensive surveys for this plant within the project area have not been undertaken. It will be necessary to identify appropriate habitat and survey for this plant within the project area before a determination can be made as to the presence or the possible impact of the project on this species.

Disturbance of foraging bald eagles is most likely to occur along the Sacramento River north of Sacramento and might occur as a result of removal of perching habitat (trees and snags) or the because of construction noise and activities. More detailed literature review, interviews with experts, and field observations are needed to determine whether eagles are present in specific project Phase areas. If such is the case, coordination with FWS will be necessary to determine appropriate replacement plantings.

The peregrine falcon is not expected to be affected by the proposed project since it is not reported to occur in this area and there is a paucity of suitable nesting habitat nearby.

All proposed options avoid or minimize disruption of the waterward side of the levees. No work will be undertaken at the water's edge. No impact to fisheries, including the winter-run chinook salmon, is anticipated.

5.0 COORDINATION

Both informal and formal coordination with the FWS has been maintained throughout the preparation of the biological data report. The COE solicited and received from the Service (December 14, 1991; February 13, 1990) a list of threatened and endangered species as well as other species of concern.

Coordination with the National Marine Fisheries Service

resulted in a letter from them to the Corps (March 5, 1991) in which they indicate that the winter-run salmon is not expected to be impacted by the project (Appendix C).

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7.0 LIST OF PREPARERS AND REVIEWERS

Name Discipline/ Expertise	Experience	Role in Preparation
Charles Baad General Biology/ Student Aid	15 mos U.S. Army Corps	Mapping data from NDDB
Fred Kindel Wildlife Biologist/ Environmental Planner	26 years Environmental Planning Studies, U.S. Army Corps of Engineers 8 yrs State and Private Wildlife Management	Report review and editing
Patricia Roberson Environmental Planner	5 years Planning Studies, U.S. Army Corps of Engineers	Report review and editing
Tanis Toland Ecologist/ Environmental Planner	6 mos U.S. Army Corps of Engineers	Research and writing
Mike Welsh General Biologist/ Environmental Planner	13 yrs Engineering and Planning Studies, U.S. Army Corps of Engineers	Report review and editing
Christine Wetzel Student Aid	1 year U.S. Army Corps of Engineers	Mapping data from NDDB

BIOLOGICAL DATA REPORT

APPENDICES

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Fish and Wildlife Enhancement
Sacramento Field Office
2800 Cottage Way, Room E-1803
Sacramento, California 95825-1846

In Reply Refer To:
1-1-91-SP-66

December 14, 1990

Mr. Walter Yep
Chief, Planning Division
Environmental Resources Branch
Sacramento District Corps of Engineers
650 Capitol Mall
Sacramento, California 95814-4794

Subject: Species List for the Sacramento River Flood Control Systems Evaluation Phases II-V. Sacramento County, California

Dear Mr. Yep:

As requested by letter from your agency dated October 25, 1990, you will find attached a list of the listed endangered and threatened species that may be present in the subject project area. (See Attachment A.) To the best of our knowledge, no proposed species occur within the area. This list fulfills the requirement of the Fish and Wildlife Service to provide a species list pursuant to Section 7(c) of the Endangered Species Act, as amended.

Some pertinent information concerning the distribution, life history, habitat requirements, and published references for the listed species is also attached. This information may be helpful in preparing the biological assessment for this project, if one is required. Please see Attachment B for a discussion of the responsibilities Federal agencies have under Section 7(c) of the Act and the conditions under which a biological assessment must be prepared by the lead Federal agency or its designated non-Federal representative.

Formal consultation, pursuant to 50 CFR § 402.14, should be initiated if you determine that a listed species may be affected by the proposed project. Informal consultation may be utilized prior to a written request for formal consultation to exchange information and resolve conflicts with respect to a listed species. If a biological assessment is required, and it is not initiated within 90 days of your receipt of this letter, you should informally verify the accuracy of this list with our office.

Also, for your consideration, we have included a list of the candidate species that may be present in the project area. (See Attachment A.) These species are currently being reviewed by our Service and are under consideration for possible listing as endangered or threatened. Candidate species have no protection under the Endangered Species Act, but are included for your consideration as it is possible that one or more of these candidates could be proposed and listed before the subject project is completed. Should the biological assessment reveal that candidate species may be adversely affected,

you may wish to contact our office for technical assistance. One of the potential benefits from such technical assistance is that by exploring alternatives early in the planning process, it may be possible to avoid conflicts that could otherwise develop, should a candidate species become listed before the project is completed.

Please contact Peggie Kohl at 916/978-4866 (FTS 460-4866) if you have any questions regarding the attached list or your responsibilities under the Endangered Species Act.

Sincerely,

James D. Carson

for Wayne S. White
Field Supervisor

Attachments

ATTACHMENT A

LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES AND CANDIDATE SPECIES THAT MAY OCCUR IN THE AREA OF THE SACRAMENTO RIVER FLOOD CONTROL SYSTEMS EVALUATION PHASES II-V, SACRAMENTO COUNTY, CALIFORNIA
(1-1-91-SP-66, DECEMBER 14, 1990)

Listed Species

Fish
- winter-run chinook salmon, *Oncorhynchus tshawytscha* (T)

Birds
- bald eagle, *Haliaeetus leucocephalus* (E)
- American peregrine falcon, *Falco peregrinus anatum* (E)

Invertebrates
- valley elderberry longhorn beetle, *Desmocerus californicus dimorphus* (T)

Plants
- palmate-bracted bird's beak, *Cordylanthus palmatus* (E)

Candidate Species

Fish
- Sacramento splittail, *Pogonichthys macrolepidotus* (2)
- delta smelt, *Hypomesus transpacificus* (1)

Amphibian
- California tiger salamander, *Ambystoma tigrinum californiense* (2)
- California red-legged frog, *Rana aurora draytoni* (2)

Reptiles
- giant garter snake, *Thamnophis couchi gigas* (2)

Birds
- ferruginous hawk, *Buteo regalis* (2)
- tricolored blackbird, *Agelaius tricolor* (2)

Mammals
- San Joaquin pocket mouse, *Perognathus inornatus inornatus* (2)
- San Joaquin valley woodrat, *Neotoma fuscipes riparia* (2)

Invertebrates
- Sacramento Valley tiger beetle, *Cicindela hirticollis abrupta* (2R)
- Sacramento anthicid beetle, *Anthicus sacramento* (2)
- vernal pool branchinecta, *Branchinecta lynchi* (2R)
- California linderiella, *Linderiella occidentalis* (2R)

Plants

Suisun aster, *Aster chilensis* var. *lentus* (2)
heart-scale, *Atriplex cordulata* (2)
California hibiscus, *Hibiscus californicus* (2)
delta tule-pea, *Lathyrus jepsonii* ssp. *jepsonii* (2)
Mason's lilaeopsis, *Lilaeopsis masonii* (2)
Colusa grass, *Neostapfia colusana* (1)

(E)--Endangered (T)--Threatened (CH)--Critical Habitat
(1)--Category 1: Taxa for which the Fish and Wildlife Service has sufficient biological information to support a proposal to list as endangered or threatened.
(2)--Category 2: Taxa for which existing information indicated may warrant listing, but for which substantial biological information to support a proposed rule is lacking.
(2R)-Recommended for Category 2 status.
(*)--Possibly extinct.

ATTACHMENT B

FEDERAL AGENCIES' RESPONSIBILITIES UNDER SECTIONS 7(a) and (c) OF THE ENDANGERED SPECIES ACT

SECTION 7(a) Consultation/Conference

Requires: 1) Federal agencies to utilize their authorities to carry out programs to conserve endangered and threatened species; 2) Consultation with FWS when a Federal action may affect a listed endangered or threatened species to insure that any action authorized, funded or carried out by a Federal agency is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. The process is initiated by the Federal agency after determining the action may affect a listed species; and 3) Conference with FWS when a Federal action is likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed critical habitat.

SECTION 7(c) Biological Assessment--Major Construction Activity[1]

Requires Federal agencies or their designees to prepare a Biological Assessment (BA) for major construction activities. The BA analyzes the effects of the action[2] on listed and proposed species. The process begins with a Federal agency requesting from FWS a list of proposed and listed threatened and endangered species. The BA should be completed within 180 days after its initiation (or within such a time period as is mutually agreeable). If the BA is not initiated within 90 days of receipt of the list, the accuracy of the species list should be informally verified with our Service. No irreversible commitment of resources is to be made during the BA process which would foreclose reasonable and prudent alternatives to protect endangered species. Planning, design, and administrative actions may proceed; however, no construction may begin.

We recommend the following for inclusion in the BA: an on-site inspection of the area affected by the proposal which may include a detailed survey of the area to determine if the species or suitable habitat are present; a review of literature and scientific data to determine species' distribution, habitat needs, and other biological requirements; interviews with experts, including those within FWS, State conservation departments, universities and others who may have data not yet published in scientific literature; an analysis of the effects of the proposal on the species in terms of individuals and populations, including consideration of indirect effects of the proposal on the species and its habitat; an analysis of alternative actions considered. The BA should document the results, including a discussion of study methods used, any problems encountered, and other relevant information. The BA should conclude whether or not a listed or proposed species will be affected. Upon completion, the BA should be forwarded to our office.

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[1] A construction project (or other undertaking having similar physical impacts) which is a major Federal action significantly affecting the quality of the human environment as referred to in NEPA (42 U.S.C. 4332(2)C).

[2] "Effects of the action" refers to the direct and indirect effects on an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action.

Appendix B

The Natural Diversity Data Base (NDDB) is a statewide manual and computerized inventory of locational information on California's rare and endangered species and natural biotic communities. Established by state legislation in 1982, the Data Base is patterned after other natural heritage programs which were originally created by The Nature Conservancy. It is managed by The California Department of Fish and Game. Officially listed (state and federal) endangered, threatened, and rare animals and plants, plus those considered by the scientific community to be deserving of such listing are included in the Data Base. Information in the Data Base comes primarily from scientific literature, herbaria and natural history museum collections, universities, volunteers with the California Native Plant Society and the Audubon society, The Nature Conservancy, and biologists from many other agencies and organizations. Information in the Data Base is continually updated (CDFG 1986).

The copy of the Data Base used for this report is limited by the fact that the latest update was probably obtained in 1989. For this reason we are likely to be missing information on the most recent sightings and research on rare species in California. In addition, the Data Base lacks information on six of the species of concern considered in this report. These species have only recently been formally identified as being rare but none of them are Federally listed as Threatened or Endangered.

Appendix C

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
300 South Ferry Street
Terminal Island, California 90731

March 5, 1991 F/SWR14:TDW

Colonel Lawrence R. Sadoff
District Engineer
Sacramento District
Corps of Engineers
650 Capitol Mall
Sacramento, California 95814

Dear Colonel Sadoff:

This letter is in response to your request for classification regarding the presence of winter-run chinook salmon in the project areas of the Sacramento System Evaluation, Phases II-V.

As we understand the project, all work will take place in-board of the levees with no in-river work anticipated. Winter-run chinook salmon will not be impacted by the project as proposed. Therefore, there is no need to proceed further with the Section 7 consultation process on the project. If, however, it is later determined that any of the phases will involve in-river work, please contact us as soon as possible so we may re-initiate consultation.

If you have questions concerning these comments or wish to discuss the project further, please contact Diane Windham of my staff at: National Marine Fisheries Service, 777 Sonoma Avenue, Room 325, Santa Rosa, California 95404; telephone (707) 578-7513.

Sincerely,

E.C. Fullerton
Regional Director

APPENDIX D

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Fish and Wildlife Enhancement
Sacramento Field Office
2800 Cottage Way, Room E-1803
Sacramento, California 95825-1846

August 9, 1990

Colonel Jack A. LeCuyer
District Engineer
Sacramento District, Corps of Engineers
650 Capitol Mall
Sacramento, CA 95814

Subject: CE-Sacramento River Flood Control System Evaluation, Phase III, Sacramento, California

Dear Colonel LeCuyer:

This planning aid letter is provided pursuant to the scope of work for fiscal year 1990. It describes 1) fish and wildlife resources found within the Mid-Valley project area, and 2) the potential impacts of remedial repairs presently under investigation by the Corps of Engineers on these resources.

The information provided herein is preliminary in nature and is provided as technical assistance to aid your planning process. It does not constitute our detailed report as called for in Section 2 of the Fish and Wildlife Coordination Act.

Our recommendations are based on mitigation and compensation commensurate with the fish and wildlife values involved and adhere to the sequential levels identified by the Service and the Council on Environmental Quality.

This analysis is based on 1) preliminary project information provided by the Corps of Engineers through May, 1990, and 2) field surveys conducted on February 20 and May 16, 1990. The analysis contained in this report will not remain valid if modifications are made in the described plan, if the resource base changes, or if anticipated futures based on very preliminary Corps information are altered.

We have not applied the Fish and Wildlife Service's Habitat Evaluation Procedures (HEP) to this project. A HEP and Fish and Wildlife Coordination Act report will be required at the next phase (feasibility phase) of planning for this project.

This letter has been coordinated with the California Department of Fish and Game. All preliminary information presented herein regarding

endangered, threatened, and candidate species has been coordinated with our Habitat Conservation staff.

INTRODUCTION

The Sacramento River Flood Control Project, authorized by the Flood Control Act of 1960, consists of approximately 1000 miles of levees plus overflow weirs, pumping plants and bypass channels that protect communities and agricultural lands in the Sacramento Valley and Sacramento - San Joaquin Delta (Jones and Stokes, 1987). The present Corps of Engineers' study is being conducted to determine the long-term integrity of the flood control system for the Sacramento River and its tributaries. It was initiated because of the 1986 flood event which severely stressed the existing levee system in the study area, caused some levee failures, and hence, raised the question of levee reliability.

The Corps of Engineers' levee system study authorized by the Energy and Water Development Appropriation Act of 1987, is divided into five phases:

Phase I - Levees in the Sacramento urban area. The initial appraisal report was completed in 1988, and construction of remedial repairs is expected to begin in 1990.

Phase II - Both banks of the Feather River. Levees around Marysville/Yuba City, Wadsworth Canal, Sutter Bypass, and a portion of the Bear River.

Phase III - Levees along Yankee Slough, Bear Creek, Dry Creek, the north levee of the Natomas Cross Canal, lower Feather River, south levee of Tisdale Bypass, Sutter Bypass, right bank of Sacramento River from Tisdale Bypass between Putah Creek and Fremont Weir, Cache Creek, Willow Slough Bypass, and Putah Creek. This phase also includes the left bank of the Sacramento River from Knight's Landing to the Sacramento Bypass, the north levee of the Sacramento Bypass, the left bank of the Sutter Bypass from Tisdale Bypass to the Fremont Weir, the right bank of the Yolo Bypass from the Sacramento Bypass to the Fremont Weir and the left bank of the Yolo Bypass from the Fremont Weir to Putah Creek.

Phase IV - Right and left bank levees along the Sacramento River from Freeport south to the Delta (at Collinsville). All Sacramento River Flood Control Project levees in the Delta.

Phase V - Left bank Sacramento River from Tisdale Bypass to Knight's Landing Ridge Cut. Both banks of the Sacramento River from Tisdale Bypass north to Vina. Levees along Cherokee Canal, Butte Creek, Sycamore Creek, Mud Creek, and Deer Creek.

This evaluation includes only the areas identified in Phase III. Engineering evaluations done by the Corps in 1988 and 1989 indicate that

levees in the Phase III project area do not meet the existing design requirements originally authorized by Congress.

DESCRIPTION OF AREA

The Mid-Valley project area primarily lies to the north and west of the Sacramento Metropolitan area, encompassing portions of Sacramento, Sutter and Yolo Counties. The project area extends north of Sacramento along the Sacramento River to the Tisdale Bypass, west to levees along the Sacramento River between the Tisdale Bypass and Knight's Landing, south along the Yolo Bypass to Putah Creek, and east to levees along the Sacramento and Feather Rivers, and the Natomas Cross Canal. Levees along Dry Creek, Bear Creek, and Yankee Slough were also included within the study area, but are not scheduled for remedial repairs.

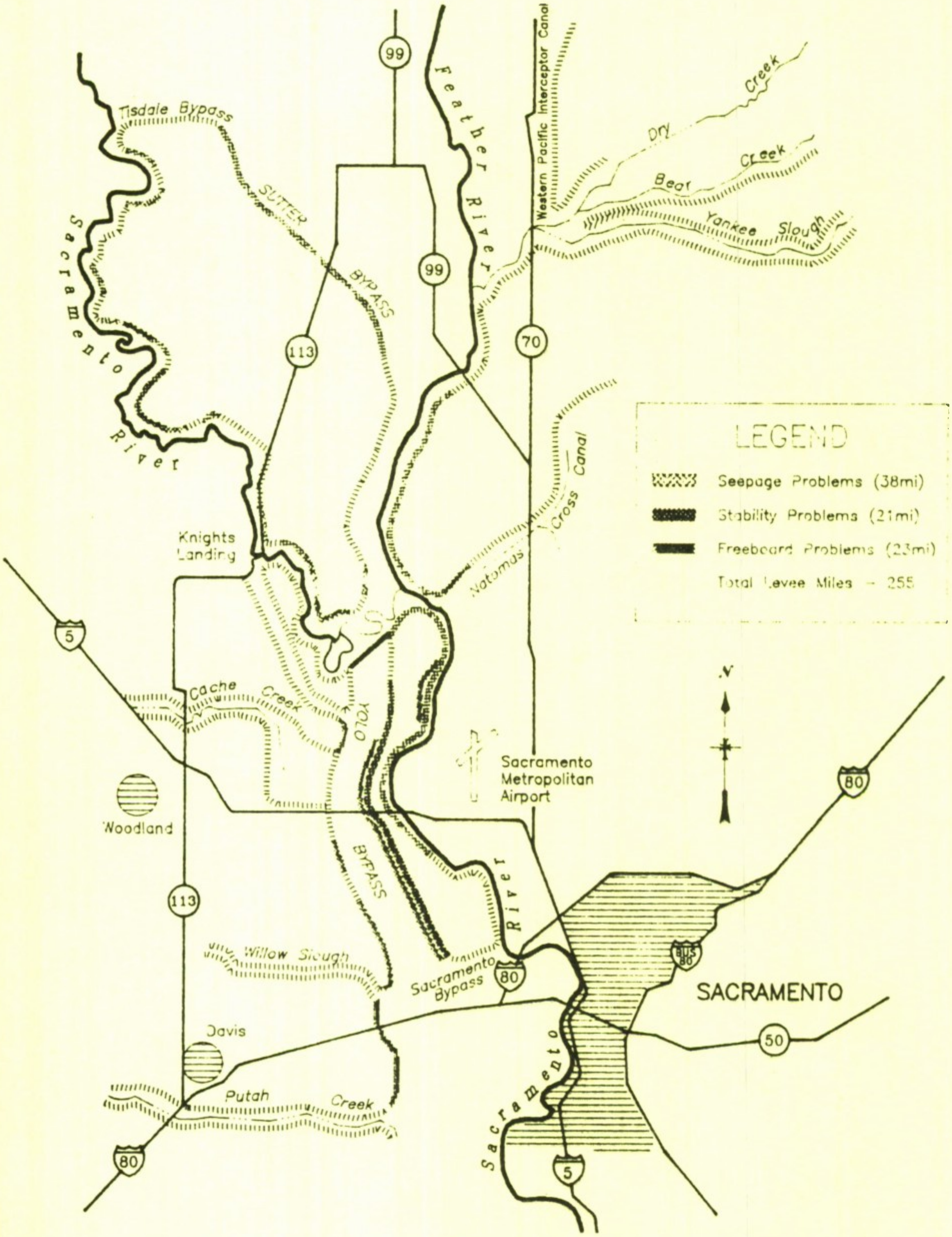
The Sacramento River system is the largest watershed in California, draining 26,300 square miles of the Central Valley, the Coast, Cascade and the Sierra Nevada mountain ranges. A system of levees bounds much of the Sacramento River downstream from the city of Chico to the Delta. Flows are regulated by major dams and reservoirs, such as Shasta on the mainstem and Whiskeytown, Oroville, New Bullards Bar, Folsom, Black Butte, and Berryessa on the tributaries. In addition, water is transferred from the Trinity River to the Sacramento River via Whiskeytown and Keswick Reservoirs. Since the construction of these storage facilities, the river is used to transport this water to the Sacramento-San Joaquin Delta and the state and federal export pump facilities. The sustained high-water level during the summer months, although controlled by upstream developments, contributes to some streambank erosion. The major factor contributing to the erosion of riverbanks, however, is winter flood flows. This has been attenuated due to decreasing annual precipitation and subsequent low flows for the past four years. Two-thousand square miles of fertile agricultural land and about fifty communities are located in the floodplain. Figure 1 shows the Phase III, Mid-Valley project area.

DESCRIPTION OF PROJECT ALTERNATIVES

Background

The Corps has determined that of 255 miles of levees surveyed within the study area, approximately 82 miles will require repairs. Specifically, the potential remedial repairs to the original project proposed in Phase III could consist of levee repair to correct 38 miles of seepage, 21 miles of stability, and 23 miles of levee subsidence problems.

The repairs would consist of relocating existing drainage ditches, toe drain placement, or levee raising which may be constructed waterward, landward or straddling the existing levee. The areas designated for levee work are: 1) the left bank of the Sutter Bypass downstream of Tisdale



Sacramento River Flood Control
System Evaluation
Phase III
Mid-Valley Area

STUDY AREA

Sacramento District, Corps of Engineer

Figure 1

Weir to control seepage; 2) the right bank of the Sacramento River from Tisdale Bypass to Knight's Landing Ridge Cut to repair seepage and stability problems; 3) the left bank of the Sacramento River from the Fremont Weir to the Sacramento Bypass to repair seepage and stability problems; 4) the left bank of the Feather River from the Highway 99 bridge downstream to the Sacramento River confluence to control seepage; 5) the north levee of the Natomas Cross Canal to correct subsidence problems; 6) the right bank of the Yolo Bypass from the Fremont Weir to the Sacramento Bypass to repair stability and subsidence problems; and 7) the left bank of the Yolo Bypass to correct subsidence problems.

The four Alternatives being considered are as follows:

Alternative A - Raise the levee crown and bank. This option would provide the design freeboard originally authorized by Congress for a specified flow. Specific dimensions will vary according to the type of reconstruction required. According to sketches provided by the Corps, addition of fill to the crown may be as much as 4 feet. This reconstruction will cover the entire slope of the levee, and permanently cover 13 to 15 feet beyond the existing toe of the levee.

Construction may take place on the waterside or landside of the levee, or it may straddle the levee on both sides. A 2:1 or 3:1 slope would be maintained, depending on waterside or landside construction. According to information provided by the Corps, a total width up to 50 feet may be impacted on each side of the levee, which would encompass berm stabilization and related construction activities at a particular site.

Alternative B - Raise the levee crown and bank, plus installation of a toe drain. Same as Alternative A except that toe drains would be constructed in areas where insufficient drainage of the seepage water exists. In addition to correcting freeboard, this alternative will correct piping problems.

Alternative C - Construction of a sloping drain and stabilizing berm. This alternative is designed to improve structural stability and to correct piping problems. The lower one-half of the levee will be strip cut to a depth of approximately 6 inches and reinforced by installing filter fabric and drainage rock from the bank down to the levee toe. The reinforcement will extend out approximately 15 feet from the toe. An embankment approximately 7 feet from the ground would be maintained and gently sloped, forming about a 12-foot-wide berm. At the end of this berm, it would be sloped at a 2 1/2 (horizontal):1 (vertical) to the toe of the levee.

Alternative D - Insert a soil or cement bentonite cutoff (slurry) wall within the existing levee. This alternative would improve structural stability and correct piping problems. A 3-foot-wide trench would be dug in the center of the levee crown which would extend into the levee

foundation. This trench would then be filled with the appropriate material to minimize seepage through the levee.

BIOLOGICAL RESOURCES

Existing Conditions

Vegetation

Many significant and diverse habitat types are found within the Mid-Valley project area. Essentially six different habitat types occur: a) wetlands/marshes; b) woody riparian; c) scrub/shrub; d) oak woodland; e) mixed herbaceous; and f) shaded riverine aquatic cover. These native habitats are critical to fish and wildlife populations in the area.

Historically, the constant meandering, seasonal flooding and sediment deposition by the Sacramento River and to a lesser extent, the Feather River, created extensive natural levees, numerous sloughs, islands and marsh areas. Many areas, once covered with extensive riparian forests and lakes which provided diverse habitats, supported high populations of numerous wildlife species. Conversion of these native lands to agricultural and urban land uses has precipitated the decline of these populations, some to the point of threatened or endangered status. An estimated 90 to 98 percent of California's native wetland habitats such as riparian forests and permanent and seasonal marshes have been lost or extensively altered. A small percentage of the original acreage of native habitat now remains in the project area.

<u>Sacramento and Feather Rivers</u>. Within the study area, vegetation along the Sacramento and Feather Rivers varies in density, width and species composition depending on physical parameters such as land use, placement of riprap, location of levees, and levee maintenance practices.

Generally, stands of riparian vegetation occur along the rivers within the levees, while vegetation on the levee slopes and at the outside toe of the levee consists primarily of grasses and forbs, with a scattering of singular or small stands of oaks, willows or cottonwoods. Land use on the landward side of the levees is primarily agricultural.

Within the riparian corridor, tree canopy consists primarily of valley oak, sycamore, cottonwood, and large willow. Grape or mistletoe are sometimes present. A well-defined woody understory typically consisting of box elder, black walnut, white alder, Oregon ash, elderberry, and smaller cottonwood occurs in most undisturbed areas. California grape, blackberry, raspberry mugwort, western ragweed, pigweed, clover, cocklebur, several thistles, grasses and forbs form an often dense ground cover. Non-native woody species which may be commonly found include eucalyptus, acacia, giant reed and honey locust.

Levee slopes and berms may contain several varieties of grasses, forbs, weeds and small woody species, such as cottonwood or willow. These areas provide valuable habitat for small mammals, such as rabbits and mice, which in turn provide a food base for larger animals, such as coyotes and raptors.

Specifically, riparian vegetation along the banks of the Sacramento River occurs in varying conditions within the project area. Where vegetation is present, it usually occurs in narrow but dense bands along the banks. Set-back levees in some areas allow larger parcels of dense, high value riparian habitat to occur adjacent to the river. Much of the Sacramento River between Verona and the Tisdale Weir has undergone extensive bank protection work and levee maintenance. These practices have permanently eliminated or degraded much of the riparian vegetation in these areas, resulting in little if any habitat value for fish and wildlife species. Along the Feather River, from the Garden Highway, at the confluence of the Feather River and the Sacramento River to Highway 99, riparian forest habitat consists primarily of a dense, relatively wide band of vegetation on the west bank of the river, while vegetation on the east bank is narrow and sparse.

<u>Sutter Bypass</u>. Narrow strips of riparian habitat line both banks of the river within the existing levees. The levee slopes and outside toe of the levee are covered by herbaceous vegetation, and essentially void of any trees or shrubs.

<u>Yolo Bypass</u>. In the project area, vegetation waterward of the levee consists primarily of very narrow strips of riparian habitat dominated by willows, alders, and oaks. A dense stand of trees occurs on the west bank while the east bank, having undergone substantial revetment work, supports only a very sparse scattering of trees.

<u>Natomas Cross Canal</u>. The Natomas Cross Canal is heavily vegetated with woody riparian vegetation, mainly willow and cottonwood, within the existing levees. The landward slope of the levee consists primarily of grasses and forbs with singular or small stands of oaks found periodically near the irrigation and drainage ditch at the toe of the levee. The ditch supports dense stands of emergent aquatic vegetation along its length. The levee slope is maintained by periodic mowing, spraying and burning. Other than grasses and forbs, few shrubs or trees are found on the landward side levee slope. Lands adjacent to the south levee of the Natomas Cross Canal are used primarily for growing rice and as hunting clubs.

Permanent freshwater marshes may be found in several reaches of the Sacramento and Feather Rivers and associated sloughs. They are characterized by persistent, dense stands of non-woody emergent vegetation. Common species include cattails, giant bulrush, umbrella sedge, smartweed, iceplant, California hibiscus and marsh pennywort. Marshes provide critical feeding habitat and cover for certain waterfowl,

such as surface-feeding and diving ducks, and also to wading birds, such as egrets and herons.

Fish Resources

Sacramento River. The Sacramento River supports an array of anadromous and resident fish species. Anadromous fishes of the Sacramento River system in the project area include chinook salmon, steelhead trout, striped bass, American shad and sturgeon. Resident warmwater fish include largemouth bass, crappie, catfish, bluegill, tule perch, and sunfish.

Of greatest importance to California fisheries is the chinook salmon. The Sacramento River supports the largest chinook salmon population in the state. Approximately 90 percent of the Central Valley salmon population spawn in this system (Kjelson 1982). Four genetically distinct species of chinooks presently use the river: fall-, late fall-, winter- and spring-run. Fall-run salmon are most abundant, comprising about 80 percent of the four runs (Kjelson 1982). According to Hallock, 1987, "Total numbers of salmon that spawn in the Upper Sacramento River system have declined more than 75 percent since the 1950's. Fall-run salmon, which make up more than 90 percent of the total, appear to be stabilized at a low level of 200,000 fish; 85 percent spawn naturally and 15 percent are spawned artificially at hatcheries. However, on streams where there are hatcheries, populations are increasing, which is masking the true picture, i.e., the natural spawning populations are declining in the Upper Sacramento River system." Winter-run salmon have experienced the most precipitous decline and was listed as threatened species in 1989 by the National Marine Fisheries Service. Counts of winter-run salmon passing the Red Bluff Diversion Dam from 1967 range from a high of 117,080 in 1969 to a low of 400 adults in 1989 (Hallock 1987, Pacific Fishery Mgmt. Council 1990). Documentation of the fall-run chinook salmon decline is extensive, indicating the 1985 population count is about 17 percent of the spawning population in the 1950's (Michny and Deibel 1986). Between the four races of salmon and the steelhead trout, some life stages of salmonids occur in the Sacramento River system at any given time.

Adult steelhead trout use the lower and middle Sacramento River as a migration corridor into the upper Sacramento River system during the fall and winter. Spawning occurs in most tributaries with year-round flows from December through April. Juveniles migrate downstream primarily in the spring after two or more years of rearing in upstream areas. The current steelhead population is estimated at less than half their numbers in the 1950's (Hallock 1987).

Most of California's shad and striped bass spawn in the Sacramento River system. The American shad population has flourished in the past few years, and is estimated to be several million (FWS 1976). Striped bass populations, however, are experiencing a decline. In the 1960's, the striped bass population for the Sacramento River was estimated to be 3.0

to 4.5 million; in the 1970's, the population declined to 1.7 million. In 1977 the population was between 0.8 to 1.2 million (Kohlhorst 1990). It continues to steadily decline.

White sturgeon populations are also considered unstable. Although population estimates have increased substantially since the 1970's, extreme fluctuation in numbers of fish is of concern. It is estimated that approximately 130,000 fish now reside in the Sacramento River.

Other fish species, including largemouth bass, crappie, bluegill and sunfish, can be found in the study area. These species use river backwater areas where current velocities are slower and more conducive to requirements of the fish. Most species may be found along vegetated shorelines of the river and associated sloughs where valuable cover is provided by overhanging and/or partially submerged shrubs or trees (referred to as shaded riverine aquatic habitat). Species such as the Sacramento squawfish, hardhead and Sacramento sucker are most abundant in the larger tributaries between the 300 to 2000 foot elevation. They prefer large, deep, well-shaded, sand- or rock-bottomed pools. Fish habitat is substantially enhanced by the diversity offered by this land-water interface and adjacent berms.

Feather River. Fish resources of the Feather River include anadromous species such as chinook salmon, steelhead trout, American shad, striped bass, green and white sturgeon, and Pacific lamprey. The number of adult chinook salmon returning to spawn on the Feather River average nearly 51,000, 15 percent of which return to the Feather River Hatchery at Oroville. Approximately 20,000 steelhead trout use the Feather River for spawning and rearing. Spawning by both species takes place above Marysville.

The Feather River supports one of the only two known established populations of northern spotted bass in California. The other population resides in the Consumnes River. Northern spotted bass is an introduced species, brought to California from Ohio in 1933 (Moyle 1972).

Bear Creek, Dry Creek, and Yankee Slough. Little information is available on fishery resources of Bear Creek, Dry Creek and Yankee Slough. It is known that Dry Creek supports a large population of centrarchids, including smallmouth bass. Small runs of chinook salmon and steelhead also occur in the stream.

Shaded riverine aquatic habitat is a habitat type that is found along rivers and streams, where overhanging or submerged vegetation exists, usually along natural banks which are not riprapped or maintained by local flood control districts. By definition, at least 10 horizontal feet of vegetation overhangs the water surface to qualify as shaded riverine aquatic habitat. This provides cooler shaded environment for a portion of the day to fish and other aquatic organisms seeking cover (DeHaven & Weinrich 1988). Cover of this type may also be provided by uneven bank

edges or crevices within the bank, providing cool water habitat for fish. Higher food production may be found in these areas also. Insects which frequent the overhanging vegetation are food for fish. Also, leaf litter and submerged vegetation provide a detritus base for microorganisms. This productive interaction of terrestrial and aquatic environments is consequently a valuable cover type for fish.

Yolo Bypass. The same anadromous fish species identified in the Sacramento River system are also occasionally present in several of the borrow ditches within the Yolo Bypass such as the Tule Canal and Knights Landing Ridge Cut. Some of the borrow ditches adjacent to the levees support a significant warmwater fishery consisting of largemouth bass, crappie, catfish and bluegill. Several nongame fish such as carp, suckers, minnows, and mosquitofish are also present. Shaded riverine aquatic cover is scarce in these areas, and occurs when an occasional shrub or tree is present.

Most of the species found in the Sacramento River system may enter the Yolo Bypass during storm events. There is little information available on fish population levels, habitat conditions, and sportfishing effort and success in the Yolo Bypass, borrow ditches, and canals within the Yolo Bypass.

Natomas Cross Canal. The Natomas Cross Canal supports several species of fish despite low water quality. Species such as catfishes, common carp, mosquitofish, largemouth bass and other sunfish, frequent the channel. Generally, during the rainy season (October and November), a small number of fall-run chinook salmon enter the East Natomas Drainage Canal and Natomas Cross Canal from the Sacramento River and migrate up Dry Creek to spawn in the tributary streams. The size of the run varies depending partly on water quality and flows in Dry Creek and the canals during salmon migration periods in the Sacramento River.

Wildlife Resources

The abundance and distribution of wildlife resources in the project area is directly related to available habitat. Wildlife found in the project area is not as well represented as it was before agricultural development permanently removed much of the natural habitat. Many wildlife species are unable to adapt to other habitat types or altered habitat conditions. These specialists are therefore most susceptible to habitat loss and degradation. Species which were dependent on riparian, oak woodland, marsh and grassland habitats have declined accordingly.

Riparian forest with its multi-strata structure, dense cover, and high plant species diversity, is especially productive, supporting the highest percentages of wildlife species. Existing information indicates that, in California, approximately 25 percent of native land mammal species, 50 percent of reptile species, and 75 percent of amphibian species are

dependant on riparian habitats (Leopold 1985). Invertebrates, both terrestrial and aquatic forms, are also supported in high numbers by riparian habitats. Invertebrates provide essential food sources for birds and other vertebrates. They regulate vegetative growth and most importantly, they pollinate flowering plants, thus insuring their reproduction. Restrictions in geographic movement make invertebrates especially vulnerable to habitat alteration (Faber, et. al., 1989).

The existing native habitat, especially the riparian corridors occurring along the waterways, provides habitat for many native mammal species. Audubon cottontail, brush rabbit, blacktail hare, gray squirrel, red and gray foxes, bobcat, raccoon, opossum, mink, weasel, striped and spotted skunks, badger, muskrat, river otter and beaver are found in the project area.

Native habitat also provides nesting and feeding habitat for resident birds. The Sacramento River system is part of the Pacific Flyway and provides important resting and feeding areas for migratory waterfowl, shorebirds, and other water associated birds. Other common bird species found in the project area include California quail, ring-necked pheasant, mourning dove, band-tailed pigeon, common merganser, mallard, herons, egrets, kingfisher, marsh wren, song sparrow, various owls, woodpeckers, red-tailed hawk and Swainson's hawk. A complete list of bird species found along the Sacramento River is included in the appendix.

Amphibians and reptiles found along the river include gopher snake, western fence lizard, garter snake, western pond turtle and Pacific tree frog.

Natomas Cross Canal. The Natomas Cross Canal, with its abundant riparian vegetation, center islands and a permanent water source, supports a diverse assemblage of wildlife species including deer, raptors, songbirds, waterfowl and other water-associated birds, small mammals, amphibians, and reptiles. The landward slope of the canal levee provides much less habitat for wildlife because of intensive maintenance, but is used by ground squirrels and other rodents and by raptors for foraging. Adjacent irrigation canals and rice fields provide essential habitat for migratory waterfowl, shorebirds and other water-associated birds. The rice fields provide important feeding habitat for pintails, mallards, and Canada geese, especially on a seasonal basis. Heavy use usually occurs late in the year after the start of winter rains. This area is also used extensively by other water-associated birds and many species of raptors. Raptors roost and nest in the riparian areas of the cross canal, and forage in the adjacent open agricultural fields. The irrigation canal and adjacent agricultural fields support upland birds, small mammals, reptiles and amphibians. Giant garter snakes extensively use the toe drains and irrigation canals in the area.

Endangered Species

At least four federally-listed threatened or endangered plant and/or animal species may occur within the Mid-Valley project area.

The bald eagle (Haliaeetus leucocephalus) is an endangered species which may be found near large bodies of water or free-flowing rivers. Eagles are occasionally seen using large trees and snags in riparian forests surrounding the upper Sacramento River for roosting habitat during the fall and winter. Disturbance by construction or other human activities may cause the eagles to abandon their territories or roosting sites.

The American peregrine falcon (Falco peregrinus anatum), also an endangered species, may be found throughout the Central Valley during the winter. Peregrines prey almost exclusively on birds up to the size of ducks. Peregrines can be especially sensitive to any type of human disturbance.

Winter-run chinook salmon (Oncorhynchus tshawytscha) has been recently emergency listed as threatened by the National Marine Fisheries Service. Adverse impacts could also be sustained by this species if waterside construction disturbed shaded riverine aquatic habitat or increased turbidity in the river.

The valley elderberry longhorn beetle is a federally-listed threatened invertebrate species which may be found in the project area. There are undoubtedly other areas which have extant populations of the plant. Adverse impacts to the beetle could occur if construction activities disturbed any of the plants.

The following candidate species (those species in which federal listing is pending) that may also be found in the project area:

Birds[1]

ferruginous hawk (Buteo regalis)
white-faced ibis (Plegadis chihi)

Fish

Sacramento splittail (Pogonichthys macrolepidotus)

Amphibians

California tiger salamander (Ambystoma tigrinum spp.)
California red-legged frog (Rana aurora draytoni)

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[1] Swainson's hawk, a state-listed threatened bird, also makes its nesting habitat in several areas of the lower Sacramento River from early March to August.

Reptiles

giant garter snake (Thamnophis couchi gigas)

Mammals

San Joaquin pocket mouse (Perognathus inornatus)
San Joaquin woodrat (Neotoma fuscipes riparia)

Invertebrates
Sacramento Valley tiger beetle, (Cicindela hiricollis gravida)
Sacramento anthicid beetle, (Anthicus sacramento)

Plants

California hibiscus (Hibiscus californicus)

The Swainson's hawk (Buteo swainsoni), a state-listed threatened bird, also nests along the Sacramento River from March to August.

The bank swallow (Riparia riparia), also a state-listed threatened bird, has nesting colonies located in numerous areas along the middle and upper Sacramento River. The bank swallow requires vertical natural banks formed by erosion along the river for nesting.

IMPACTS OF ALTERNATIVES

The following section is a general discussion of the significant impacts anticipated from the individual alternatives as provided by the Corps.

Alternative A - Raise levee crown and slope

The proposed 4-foot raising of the levee would adversely affect grasses and other herbaceous vegetation growing on the existing levee slope and beyond the toe of the berm (approximately 50 feet). Depending on the location of the work (landside, waterside or straddle), the impacts would differ greatly.

Waterside construction would adversely affect shaded aquatic riverine habitat, riparian vegetation, and grasses along the levee slope. Any adverse effect on shaded aquatic riverine and riparian habitat would adversely impact anadromous (adults and smolts) and resident fish species. Loss of these habitat types would reduce cover and food for fish, and nutrient input to the aquatic system. Any adverse effect on anadromous fish would be significant because Sacramento River populations are already severely depressed.

The loss of riparian vegetation along the river would adversely affect many wildlife species. The riparian forest, with its multi-layered vegetation and high plant species density, supports the largest populations and most diverse wildlife along the Sacramento River. The high diversity of tree growth, cover conditions and layers, and close proximity to water provide a wide variety of easily accessible habitats and niches. Any loss of plant diversity would adversely affect those species inhabiting the area.

Any loss of shaded riverine aquatic and riparian habitats would have a significant adverse impact on anadromous fish, raptors, songbirds, small mammals and other species that use these areas to meet part or all of their life needs. Cover and food sources for anadromous and resident fish would be lost, nesting habitat for raptors would be eliminated or greatly reduced. Construction activity during raptor nesting periods can also result in reduced nesting success. Cover and nesting habitat for songbirds would be lost, and cover, food and a portion of the migration corridor for small mammals would be eliminated.

Any disturbance and loss of riparian vegetation, and construction activity would adversely affect nesting raptors, including the Swainson's hawk. Loss or disturbance of nesting habitat could severely impact these species.

The impact on grassland habitat on the levee slopes would be minimal and temporary. Disturbance or loss of this habitat would adversely impact some small mammals, raptors, and other species. However, grasses should recover to preproject conditions within two to three years after project construction and the area repopulated by similar wildlife species.

Landside construction would impact grasses on the levee slopes, trees and shrubs growing along the levee, and wetland habitats along existing toe drains. In areas where orchards are adjacent to construction sites, impacts may be sustained by losses of some of the fruit trees, which are used by perching birds. Also, construction activity during raptor nesting periods could lead to the failure of nesting success.

The impacts on fish, wildlife and vegetation would be significantly reduced with landside construction. It would primarily eliminate or reduce any adverse project effects on riparian vegetation and shaded riverine aquatic habitat.

Straddle construction would impact the grassy levee slopes, some riparian vegetation, and trees and shrubs found immediately adjacent to the levee toe. Also, depending on the locations of the toe drains, impacts to wetland habitats could be reduced or eliminated. The impacts to shaded riverine aquatic habitat could occur; however, they should be significantly less than those expected with the waterside construction alternative.

If a landside berm is constructed with straddle construction, the impacts would be similar to landside construction.

A significant amount of borrow material would be required to raise and reinforce the levees. The impacts on vegetation and wildlife could be adverse. However, the magnitude of the impacts would vary with site location and amount of borrow material required.

Alternative B - Raise levee crown, reconstruct levee slope, and install toe drain.

The impacts of this alternative would be similar to those of Alternative A, except for the construction of toe drains. The impacts of the toe drain would vary, depending on its location and whether it is covered or not and where seepage is directed. A covered toe drain, as proposed, would have significantly less habitat value than an open toe drain. With an open toe drain, the seepage water can be used to provide a protected area for wildlife depending on how the toe drain is maintained, especially in areas presently farmed. If seepage water is allowed to flow from the toe drain into a drainage ditch, and is then directed to a nearby pond, wildlife values could be enhanced. The drainage ditch and bordering vegetation, if allowed to grow, could provide excellent cover for nesting and feeding. This type of drainage arrangement is preferred over culverting the seepage water and transporting it underground.

Alternative C - Construction of a sloping drain and stabilizing berm.

This alternative would involve the removal of grasses along the lower one-half of the levee slope on the landside of the levee and the removal of any vegetation including trees and shrubs along and adjacent to the toe of the levee (50 feet from toe). Existing toe drains and seeps could be eliminated with the construction of the berm. The stripped section of the levee would be covered with filter cloth and compacted soil, and reseeded. The area would be expected to recover in one or two years.

Habitat for small mammals, songbirds, raptors and other animal species are expected to be disturbed or degraded. The impacts can be significant if toe drains or seeps are covered and all existing drainage ditches near the levee are set back. Construction of open toe drains, drainage ditches, and seeps in their new location at least 6 months in advance of remedial repair work would provide continuous wildlife habitat over time and thus help prevent loss of animals dependent upon these areas. Also, as stated previously, raptor nesting success could be reduced if construction activity is occurs during the nesting period.

Alternative D - Insert a soil or cement bentonite cutoff (slurry) wall within the existing levee.

This alternative should have only minimal adverse effects on vegetation and wildlife of the area. Since construction would occur on top of the levee, little or no disturbance of wildlife habitat (aquatic habitat, riparian vegetation, toe drain, seeps) would occur. However, construction activity could adversely affect raptor nesting success if it is conducted during the nesting periods.

Location of the staging areas could have an adverse impact on vegetation and wildlife if they are located in sensitive areas. Also, spoil disposal could negatively impact wildlife habitat, depending on the disposal site. Disposal should be done in accordance to guidelines provided by the Service and the California Department of Fish and Game.

DISCUSSION

The Fish and Wildlife Service makes mitigation recommendations based on the value of the project area to fish and wildlife. During impact assessment, distinct habitat types which may be impacted by the project area are identified. Evaluation species which utilize each habitat type are selected for impact analysis. The selection of an evaluation species is based primarily on the following criteria: 1) the species is dependent in some way on the habitat to meet its life requisites, 2) the species is known to be sensitive to specific land and water development actions, 3) the species is representative of a guild of species that occupies a similar niche, and/or 4) the species is associated with Important Resource Problems as designated by the Director of the Fish and Wildlife Service, such as anadromous fish and migratory birds. Habitat value determinations are based on the importance of the habitat found in the project area to the selected evaluation species and the relative scarcity of the habitat types.

Of all the habitat types available to wildlife, riparian habitat supports the greatest diversity and abundance of wildlife species. Unfortunately, much of the riparian habitat necessary to maintain fish and wildlife resources has been eliminated in the project area. Instream aquatic habitat in the project area is becoming scarce. The loss of these habitat types can be attributed to numerous flood control and water storage projects, water diversions, agricultural expansion, urbanization, and pollution. The combined effects of habitat destruction (through damming, channelization and other stream alteration), habitat degradation by excessive human disturbance, and the introduction of exotic species have resulted in tremendous losses of native habitats, and subsequently, native fish and wildlife species. Land and water development projects continue to be approved and constructed.

The evaluation species selected to determine the value of riparian vegetation in the project area include water-associated birds, passerine birds, and small and large mammals which inhabit the project area. Riparian vegetation in the project area provides important nesting,

resting and/or feeding habitats for raptors, passerine and water-associated birds. The riparian corridor provides a high-value feeding habitat and migration corridor to mammal species which may occur in the project area. The riparian corridor is also of high value to chinook salmon and other anadromous fish of the Sacramento River because of the importance of vegetation in providing cover, water, temperature control, a food source, and nutrient input into the ecosystem. Because of the high value of riparian habitats in the project area to fish and wildlife species, and due to the relative scarcity of this habitat type, our goal is no net loss of in-kind habitat value.

The evaluation species selected to determine the value of instream aquatic habitat in the project area include chinook salmon (excluding winter-run), steelhead trout, and other resident and anadromous species. The Sacramento River within the project area provides principle migratory routes for anadromous fish of the Sacramento River. Therefore, the protection of instream aquatic habitat becomes extremely important in maintaining, and possibly enhancing the anadromous fish resource.

Because of the high value of instream aquatic habitats in the project area to fish and wildlife evaluation species, and because of the relative scarcity of these habitat types, our mitigation goal is no loss of in-kind habitat value. Under this mitigation goal, we will seek in-kind replacement of lost habitat values.

The evaluation species selected to determine the value of permanent and seasonal wetlands, toe drains, and associated canals in the project area include migratory waterfowl and other water-associated birds, reptiles and amphibians that frequent these areas. Seasonal wetlands provide important wintering habitat for waterfowl. As the number of permanent wetlands in the Central Valley diminishes, seasonal wetlands assume an added importance for these species. Seasonal wetlands are also becoming scarce as agricultural expansion and urban growth continues.

Because of 1) the importance of permanent and seasonal wetland areas to migratory waterfowl and other water-associated birds, protected under the Migratory Bird Treaty Act, and 2) the relative scarcity of this habitat in the region, our mitigation goal is no net loss of in-kind habitat value. Under this mitigation goal, we will seek in-kind replacement of lost habitat values.

The evaluation species selected to determine the value of oak woodlands and grasslands include raptors, songbirds and small mammals that inhabit the areas. Because these habitat types are still fairly common throughout the region and in the state, and because of the relatively high value to fish and wildlife, our mitigation goal for these habitats is no net loss of habitat value while minimizing the loss of in-kind habitat value.

To minimize the impacts of the project to fish and wildlife resources, we recommend that <u>Alternative D</u> be selected for further investigation or

implementation to provide flood protection for the Phase III project area. This alternative would have the least damaging environmental impact of all the alternatives being investigated. Disruption of landside and waterside vegetation and wildlife habitat would be minimal. Staging areas, although impacted, would recover quickly with reseeding.

Alternative C, although less desirable than Alternative D, would have less adverse impact on biological resources than Alternatives A and B. Although disturbance of vegetation would occur on the lower one-half of the levee slope, the toe drain and nearby areas, the area is expected to recover quickly if revegetation efforts are included. Also, if an open toe drain is included as part of the project, wildlife habitat values would increase.

The impacts of Alternatives A and B would be similar except for the inclusion of a toe drain with Alternative B. From an environmental viewpoint, Alternatives A and B with straddle or landside construction would be significantly less damaging than waterside construction. Alternative A with waterside construction would be the least desirable of all the alternatives presently under investigation.

To avoid any adverse impact on valuable riparian vegetation, instream aquatic habitat, and wetlands in the project area, we recommend that alternatives that impact these habitat types not be implemented. If, however, impacts to these habitats are unavoidable, impact determinations and mitigation requirements will be accomplished through the use of the Services's Habitat Evaluation Procedures (HEP).

To mitigate adverse impacts to riparian vegetation, an area of sufficient size (as determined by the HEP) should be provided for management. Plantings of indigenous riparian species (trees and shrubs) will be required in the area to gain riparian habitat values. Estimated costs to replace riparian vegetation is $25,000 per acre, excluding land acquisition and maintenance costs. Irrigation (drip system) would be required for a minimum of at least 6 years, or until the plantings are well established and self-sustaining. Any dead or decadent trees and shrubs would be replaced and maintained until well established. A detailed monitoring study would be required for a period of 20 years after the 6 year establishment period to determine the success of the plantings.

To offset the loss of instream aquatic habitat values, a planting program, coordinated with riparian plantings, would be required. Dense plantings of select indigenous trees and shrubs would be required in the river and along the bank to provide overhanging cover and exposed tree and shrub roots. This, in conjunction with the placement of tree trunks and tree root balls anchored to the river bank, may be necessary.

The loss of wetland vegetation along the toe drain and seeps can be offset through the construction of new toe drains and ponding areas. To further minimize the loss, toe drain construction should be initiated, water

provided, and vegetation planted (transplant from old drain), at least 6 months prior to covering old toe drains and seeps. This would essentially eliminate any adverse impact on this habitat type.

Any trees and shrubs removed along the landside toe of the levee and adjacent areas would require replacement. Mature trees and shrubs should be replaced at a ratio of at least five-to-one. All plantings will require watering and maintenance for a minimum of 6 years. The most efficient watering method is the drip system.

Any loss of grassland habitat values due to project construction can be offset by seeding the disturbed areas and newly created berms with native grasses and forbs. Seeding should be conducted just prior to the rainy season. This would allow sufficient germination and establishment of these species.

RECOMMENDATIONS

We recommend that:

1. Funding be provided so that the Fish and Wildlife Service can prepare a Section 2(b) Fish and Wildlife Coordination Act report for your next phase of planning for this project.

2. Based on overall impacts to fish and wildlife habitat values, Alternative D be selected for further investigation or implementation to provide flood protection to the Phase III project area. From an environmental viewpoint, we believe Alternative D would have the least adverse effect on fish and wildlife followed by Alternatives C, B and A. With regard to waterside, landside and straddle construction, we believe waterside construction would be the most detrimental of the three, followed by landside and straddle construction. Waterside construction should be avoided.

3. To mitigate any adverse impacts of the proposed alternatives on riparian vegetation, instream aquatic habitat, wetland vegetation grassland, and landside trees and shrubs, measures as indicated in the Discussion Section would be required. A determination of impacts and mitigation requirements will be accomplished through the use of the Service's Habitat Evaluation Procedure. Cost to conduct the procedure will be determined after selection of required remedial repairs and specific work sites.

4. To avoid construction activity impacts to Swainson's hawk and other raptors, construction not be conducted during the late March to early August period.

5. To minimize the loss of wetland vegetation (toe drains, seeps) with project construction, open toe drains be included in lieu of culverts.

Toe drains be designed to allow growth of wetland and other vegetation in and adjacent to the drain. Also, as a possible enhancement measure, depressions be excavated in adjacent farmlands and drain water be directed to these areas. This would promote the growth of wetland and other vegetation.

6. After completion of repair work, the levees and surrounding areas should be revegetated to restore wildlife habitat and overall environmental quality.

Additional Studies

7. If waterside construction is proposed for the middle Sacramento River and associated tributaries, the following procedures be implemented and the following studies be conducted:

a. Consultation with the National Marine Fisheries Service under Section 7 of the Endangered Species Act should be initiated for any activities which may adversely affect the winter-run chinook salmon.

b. Surveys of existing winter-, spring-, fall- or late fall-run salmon as well as other anadromous fishes. Included in the survey should be a determination of acreage and value of aquatic habitat (shaded riverine aquatic) along the river or associated tributaries.

c. Population surveys done for species of special concern, such as the Swainson's hawk and bank swallow. The surveys would include evaluating nesting sites and territories.

We appreciate the opportunity to provide input to your planning process. For further assistance regarding this letter, please contact Rebeca Keck of my staff at (916) 978-4613.

Sincerely,

James D. Carson

for Wayne S. White
Field Supervisor

cc: ARD (FWE) FWS, Portland, OR

Colonel Jack A. LeCuyer

Reg. Mgr. Region II, Rancho Cordova
NMFS, Santa Rosa

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APPENDIX 1

BIRD SPECIES SEEN ALONG THE SACRAMENTO RIVER

The following list of bird species represents a cumulation of observations over many years. Some species may be more commonly sighted than others, depending on time of year and populations of the species.

COMMON NAME	SCIENTIFIC NAME
Common Loon	Gavia immer
Arctic Loon	Gavia arctica
Red-throated loon	Gavia stellata
Red-necked grebe	Podiceps grisegena
Horned grebe	Podiceps auritus
Eared grebe	Podiceps nigricollis
Western grebe	Aechomophorus occidentalis
Pied-billed grebe	Popilymbus podiceps
White pelican	Pelecanus erythrorhynchos
Double-crested cormorant	Phalacrocorax auritus
Great blue heron	Ardea herodius
Great egret	Casmerodius albus
Snowy egret	Egretta thula
Black-crowned night heron	Nycticorax nycticorax
Least bittern	Ixobrychus exilis
American bittern	Botaurus lentiginosus
White-fronted goose	Anser albifrons
Snow goose	Chen caerulescens
Ross goose	Chen rossi
Mallard	Anas platyrhynchos
Gadwall	Anas strepera
Pintail	Anas acuta
Green-winged teal	Anas crecca
Blue-winged teal	Anas discors
Cinnamon teal	Anas cyanoptera
American widgeon	Anas americana
Northern shoveler	Anas clypeata
Wood duck	Aix sponsa
Redhead	Aythya americana
Ring-necked duck	Aythya collaris
Canvasback	Aythya valisineria
Greater scaup	Aythya marila
Lesser scaup	Aythya affinis
Common goldeneye	Bucephala clangula
Barrow's goldeneye	Bucephala islandica
Bufflehead	Bucephala albeola

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Ruddy duck	*Oxyura jamaicensis*
Hooded merganser	*Lophodytes cucullatus*
Common merganser	*Mergus merganser*
Turkey vulture	*Cathartes aura*
White-tailed kite	*Elanus leucurus*
Goshawk	*Accipiter gentilis*
Sharp-shinned hawk	*Accipter striatus*
Cooper's hawk	*Accipiter cooperii*
Red-tailed hawk	*Butoe jamaicensis*
Red-shouldered hawk	*Buteo lineatus*
Swainson's hawk	*Buteo swainsoni*
Rough-legged hawk	*Buteo lagopus*
Ferruginous hawk	*Buteo regalis*
Golden eagle	*Aquila chrysaetos*
Bald eagle	*Haliaeetus leucocephalus*
Northern harrier	*Circus cyaneus*
Osprey	*Pandion haliaetus*
Prarie falcon	*Falco mexicanus*
Peregrine falcon	*Falco peregrinus*
Merlin	*Falco columbarius*
American kestrel	*Falso sparuerius*
California quail	*Lophortyx californicus*
Ring-necked pheasant	*Phasianus colichicus*
Sandhill crane	*Grus canadensis*
Virginia rail	*Rallus limicola*
Sora	*Poranza carolina*
Common gallinule	*Callinula chloropus*
American coot	*Fulica americana*
Semipalmated plover	*Charadrius alexandrius*
Killdeer	*Charadrius vociferus*
Mountain plover	*Charadrius montanus*
American golden plover	*Pluvialis dominica*
Black-bellied plover	*Pluvialis squatorola*
Common snipe	*Capella gallinago*
Long-billed curlew	*Numenius americanus*
Whimbrel	*Numenius phaeopus*
Spotted sandpiper	*Actitis macularis*
Solitary sandpiper	*Tringa solitaria*
Willet	*Catoptrophorus semipalmatus*
Greater yellowlegs	*Tringa melanoleuca*
Lesser yellowlegs	*Tringa flavipes*
Baird's sandpiper	*Calidris bairdii*
Least sandpiper	*Calidris minutilla*
Dunlin	*Calidris alpina*
Long-billed dowitcher	*Limnodromous scolopaceus*
Western sandpiper	*Calidris mauri*
Marbled godwit	*Limosa fedoa*
American avocet	*Recurvirostra americana*

Black-necked stilt	Himantopus mexicanus
Herring gull	Larus argentatus
California gull	Larus californicus
Mew gull	Larus canus
Bonaparte's gull	Larus philadelphia
Forster's tern	Sterna forsteri
Caspian tern	Hydroprogne caspia
Black tern	Childonias niger
Band-tailed pigeon	Columba fasciata
Rock dove	Columba livia
Mourning dove	Zenaidura macroura
Barn owl	Tyto alba
Screech owl	Otus asio
Great horned owl	Bubo virginianus
Burrowing owl	Speotyto cunicularia
Long-eared owl	Asio otus
Short-eared owl	Asio flammeus
Saw-whet owl	Aegolius acadicus
Poorwill	Phalaenoptilus nuttallii
Lesser nighthawk	Chordeiles acutipennis
Vaux's swift	Chaetura vauxi
White-throated swift	Aeronautes saxatalis
Black-chinned hummingbird	Archilochus alexandri
Anna's hummingbird	Calypte anna
Rufous hummingbird	Selasphorus rufus
Allen's hummingbird	Selasphorus sasin
Calliope hummingbird	Stellula calliope
Belted kingfisher	Megaceryle alcyon
Common flicker	Colaptes auratus
Acorn woodpecker	Melanerpes formicivorus
Lewis woodpecker	Asyndemus lewis
Yellow-bellied sapsucker	Sphyrapicus varius
Hairy woodpecker	Dendrocopos villosus
Downy woodpecker	Dendrocopus pubescens
Nuttall's woodpecker	Dendrocopus nuttalli
Western kingbird	Tyrannus verticalis
Ash-throated flycatcher	Myiarchus cinerascens
Black phoebe	Sayornis nigricans
Say's phoebe	Sayornis saya
Willow flycatcher	Empidonax traillii
Western flycatcher	Empidonax difficilis
Western wood pewee	Contopus sordidulus
Olive-sided flycatcher	Nuttallornis borealis
Vermilion flycatcher	Pyrocephalus rubinus
Horned lark	Eremophila alpestris
Violet-green swallow	Tachycineta thalassina
Tree swallow	Iridoprocne bicolor
Bank swallow	Riparia riparia

Rough-winged swallow	Stelgidopteryx ruficollis
Barn swallow	Hirundo rustica
Cliff swallow	Petrochelidon pyrrhonota
Purple martin	Progne subis
Steller's jay	Cyanocitta stelleri
Scrub jay	Aphelocoma coerulescens
Yellow-billed magpie	Pica nuttalli
Common raven	Corvus corax
Common crow	Corvus brachyrhynchos
Black-capped chickadee	Parus atricapillus
Mountain chickadee	Parus gambeli
Plain titmouse	Parus inornatus
Bushtit	Psaltriparus minimus
Water pipit	Anthus spinoletta
Cedar waxwing	Bombycilla cedrorum
Phainopepla	Phainopeple nitens
Loggerhead shrike	Lanius ludovicianus
Starling	Sturnus vulgaris
Hutton's vireo	Vireo huttoni
Solitary vireo	Vireo solitarius
Orange-crowned warbler	Vermivora celata
Nashville warbler	Vermivora ruficapilla
Yellow warbler	Dendroica petechia
Yellow-rumped warbler	Dendroica coronata
Black-throated gray warbler	Dendroica nigriscens
Townsend's warbler	Dendroica townsendi
Black-throated blue warbler	Dendroica caerulescens
Black-throated green warbler	Denroica virens
Hermit warbler	Dendroica occidentalis
MacGillivray's warbler	Oporonis tolmiei
Common yellowthroat	Geothlypis trichas
Yellow-breasted chat	Icteria virens
Wilson's warbler	Wilsonia pusilla
House sparrow	Passer domesticus
Western meadowlark	Sturnella neglecta
Yellow-headed blackbird	X. xanthocephalus
Red-winged blackbird	Agelaius phoeniceus
Tri-colored blackbird	Agelaius tricolor
Hooded oriole	Icterus cucullatus
Brewer's blackbird	Euphagus cyanocephalus
Brown-headed cowbird	Molothrus ater
Western tanager	Piranga lucoviciana
Black-headed grosbeak	Pheucticus melanocephalus
Blue grosbeak	Guiraca caerulea
Lazuli bunting	Passerina amoena
Purple finch	Carpodacus purpureus
House finch	Carpodacus mexicanus
Pine siskin	Spinus pinus

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American goldfinch	Spinus tristis
Lesser goldfinch	Spinus psaltria
Lawrence's goldfinch	Spinus lawrencei
Rufous-sided towhee	Pipilo erythrophthalmus
Brown towhee	Pipilo fuscus
Savannah sparrow	Passerculus sandwichensis
Vesper sparrow	Pooecetes gramineus
Lark sparrow	Chondestes grammacus
Rufous-crowned sparrow	Aimophila ruficeps
Sage sparrow	Amphispiza belli
Dark-eyed junco	Junco hyemalis
Chipping sparrow	Spizella passerina
White-crowned sparrow	Zonotrichia leucophrys
Golden-crowned sparrow	Zonotrichia atricapilla
White-throated sparrow	Zonotrichia albicollis
Fox sparrow	Passerella iliaca
Lincoln's sparrow	Melospiza lincolnii
Song sparrow	Melospiza melodia

Source: USFWS, 1976

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Fish and Wildlife Enhancement
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2800 Cottage Way, Room E-1803
Sacramento, California 95825-1846

May 14, 1990

Colonel Jack A. Le Cuyer
District Engineer
Sacramento District, Corps of Engineers
650 Capitol Mall
Sacramento, California 95814

Subject: CE - Sacramento River Flood Control System Evaluation, Phase IV

Dear Colonel Le Cuyer:

This letter is provided pursuant to the scope of work for fiscal year 1990. It describes the fish and wildlife resources of the lower Sacramento River, from Collinsville (River Mile 0) to Freeport (River Mile 47), and the impacts flood control measures presently being investigated by the Corps of Engineers may have on these resources. The information presented herein is preliminary in nature, and is provided as technical assistance to aid your planning process. It does not constitute our detailed report to you as is required by Section 2 of the Fish and Wildlife Coordination Act.

This analysis is based on project information provided by the Corps of Engineers prior to March 15, 1990. It does not include an analysis of land use changes that could occur with implementation of proposed flood control measures, nor the impacts of those changes on fish and wildlife resources.

This letter has been coordinated with the California Department of Fish and Game and the National Marine Fisheries Service.

The Corps of Engineers' study is being conducted to determine the long-term integrity of the flood control system for the Sacramento River and its tributaries. It was initiated as a result of the 1986 flood event which severely stressed the existing levee system in the study area, caused some levee failures, and hence, raised the question of levee reliability. This was further compounded by a recent study conducted by the Federal Emergency Management Agency (FEMA) which indicated that a significantly larger segment of the project area was within the 100-year floodplain than previously determined. Results of the

FEMA study brought the area under a different set of criteria for the National Flood Insurance Program (administered by FEMA) which would affect future development of the area.

In response to this change, special Congressional legislation passed in November 1988 which deferred the use of the new flood elevations and flood insurance rates in the area for a period of four years. This was contingent upon the local agencies implementing measures to eliminate flooding problems in the area.

The Corps of Engineers' levee system study authorized by the Energy and Water Development Appropriation Act of 1987, is divided into five phases:

<u>Phase I</u> - Levees in the Sacramento urban area. The initial appraisal report was completed in 1988, and construction of remedial repairs is expected to begin in 1990.

<u>Phase II</u> - Both banks of the Feather River. Levees around Marysville/Yuba City, and Sutter Bypass.

<u>Phase III</u> - Levees along Yankee Slough, Bear River, Natomas Cross Canal (north levee), lower Feather River, Tisdale Bypass (south levee), Sutter Bypass, right bank of Sacramento River from Tisdale Bypass between Putah Creek and Fremont Weir, Cache Creek, Willow Slough Bypass, and Putah Creek.

<u>Phase IV</u> - Right and left bank levees along the Sacramento River from Freeport south to the Delta (at Collinsville). All Sacramento River Flood Control Project levees in the Delta.

<u>Phase V</u> - Left bank Sacramento River from Tisdale Bypass to Knight's Landing Ridge Cut. Both banks Sacramento River from Tisdale Bypass north to Vina. Levees along Cherokee Canal, Butte Creek, Sycamore Creek, Mud Creek, and Deer Creek.

This evaluation includes only the areas identified in Phase IV. Engineering evaluations done by the Corps in 1988 and 1989 indicate that levees in the Phase IV project area do not meet existing design requirements, and therefore, do not provide the levels of flood protection required.

DESCRIPTION OF THE AREA

The Sacramento River system is the largest watershed in California, draining 26,300 square miles of the Central Valley, the Coast, Cascade and the Sierra Nevada mountain ranges. A system of levees bounds much of the Sacramento River downstream from the City of Chico to the Delta. Flows are regulated by major dams and reservoirs, such as Shasta on the mainstem and Whiskeytown, Oroville, New Bullards Bar, Folsom, Black Butte, and Berryessa on the tributaries. In addition, water is transferred from the Trinity River to the Sacramento River via Whiskeytown and Keswick Reservoirs. Since the construction of these storage facilities, the river is used to transport this water to the Sacramento-San Joaquin Delta and the state and federal export pump facilities. The sustained high-water level during the summer months, although controlled by upstream developments, contributes to some streambank erosion. The major factor contributing to the erosion of riverbanks, however, is winter flood flows. This has been attenuated due to decreasing annual precipitation and subsequent low flows for the past four years. Two-thousand square miles of fertile agricultural land and about fifty communities are located in the system's floodplain. Figure 1 shows the study area for Phase IV, from Freeport to Collinsville.

Prior to encroachment by man upon the Sacramento River, the area from Chico Landing to Collinsville was bordered by natural levees or intermittent high banks covered with riparian forests of varied characteristics. The forests included trees of all sizes, ranging from shrub to valley oak and sycamore 75 to 100 feet high, growing closely in irregular groves or belts on most of the natural levees. These groves were generally about 2 miles wide on the smaller streams, but were narrower in the Sacramento-San Joaquin Delta.

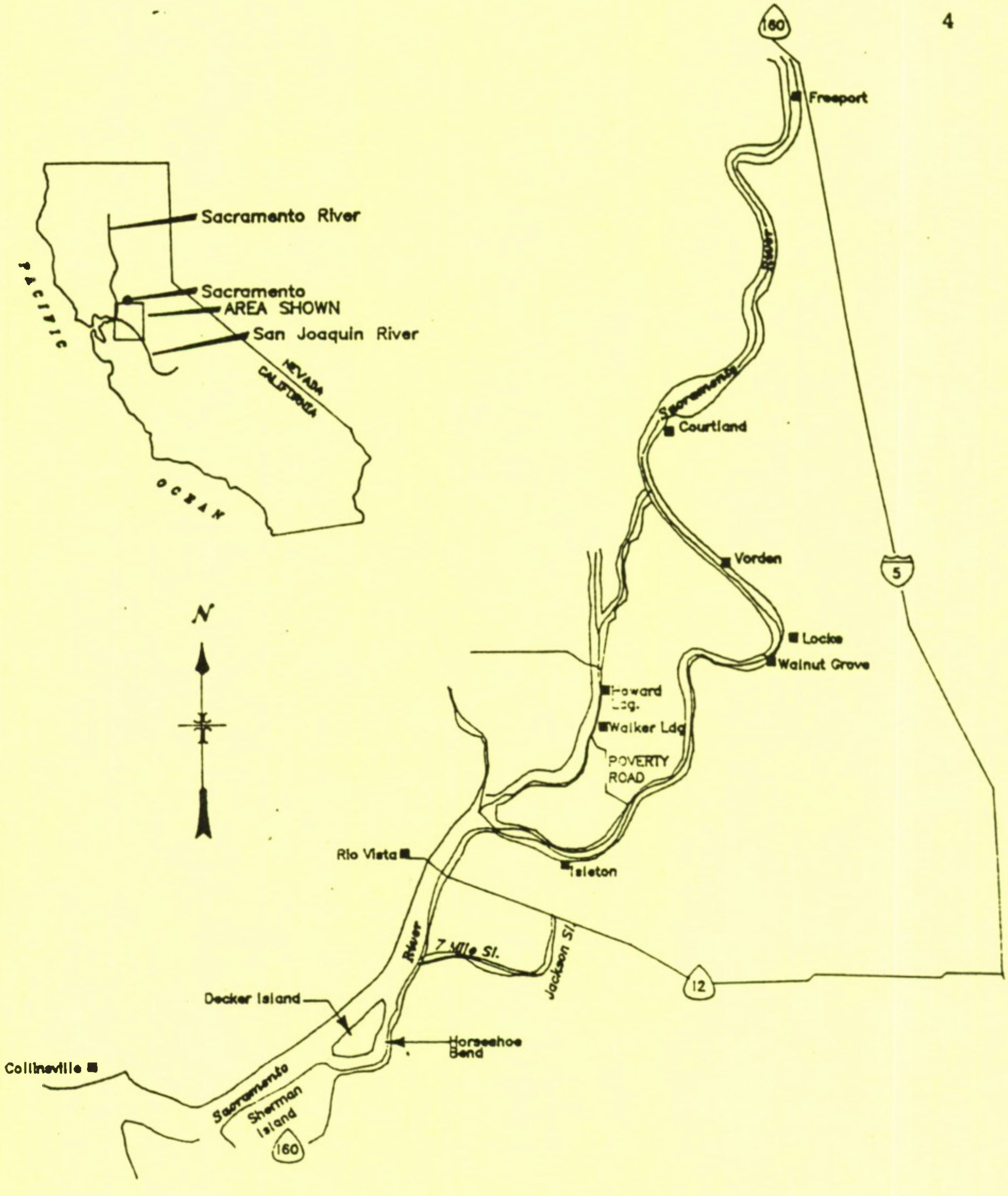


Figure 1: Sacramento River Flood Control Project
Phase IV Study Area

Source : AAA, 1988

It has been estimated that at the turn of the century there were about 470,000 acres of riparian woodlands and associated plant communities along the 184 miles of the Sacramento River between Chico and Collinsville. By the 1970's, the woodlands had been reduced to about 1 percent of the estimated acreage in riparian woodlands and associated communities existing 90 years prior to this time (USFWS, 1976). Most of this continued loss has been and is currently due to agricultural conversions. Presently, riparian vegetation along the lower river and sloughs consists of scattered narrow bands, typically ranging from a few feet to less than 30 feet in width. Of the 60 miles comprising the main river channel, 15 individual river miles have woody riparian vegetation on less than 25 percent of their bank length.

Below Sacramento, relatively low-velocity floodflows predominate. The river flow is distributed through a network of Delta channels, which are bordered by relatively low, narrow and eroding berms, and closely constrained by levees. In many places, erosion has completely removed the berm and encroached upon the levee itself. In this particular portion of the river, two additional causes of river bank erosion are believed to be boat wake and wind-induced wave action on the banks.

DESCRIPTION OF PROJECT ALTERNATIVES

Background

The Sacramento River Bank Protection Project was authorized by the Flood Control Act of 1960 (Public Law 86-645) for the specific purpose of protecting the existing levee system and associated flood control facilities of the project. The project protects low-lying areas of the Sacramento Valley and the Sacramento-San Joaquin Delta from flood flows, including large urban populations, industrial/commercial developments, agricultural operations, transportation systems and water supplies.

The project encompasses 835,000 lineal feet of the Sacramento River. Under the first phase of the project, 430,000 lineal feet of the bank protection were authorized to be completed between 1960 and 1975 along the river and associated sloughs. An additional 405,000 lineal feet were authorized for the second phase of the bank protection project during 1976 through 1991. About 130,000 feet of this total authorization remains to be constructed.

Specifically, the proposed remedial repair in Phase IV will consist of levee reconstruction at various sites along the Sacramento River from Freeport (River Mile 47) to Collinsville (River Mile 0) and associated flood control project levees, on either the left or right, or both banks of the river. As many as 75 different potential work sites have been identified. The alternative used at a particular site will depend on the geology of the site, structure of the existing levee, and the extent of repairs required. In the project areas being considered for reconstruction, river seepage is the main problem. Landside elevations are frequently lower than the level of the river, resulting in gravitational seepage of water through the levee wall, causing boils. Chronic shallow flooding of the existing land consequently occurs.

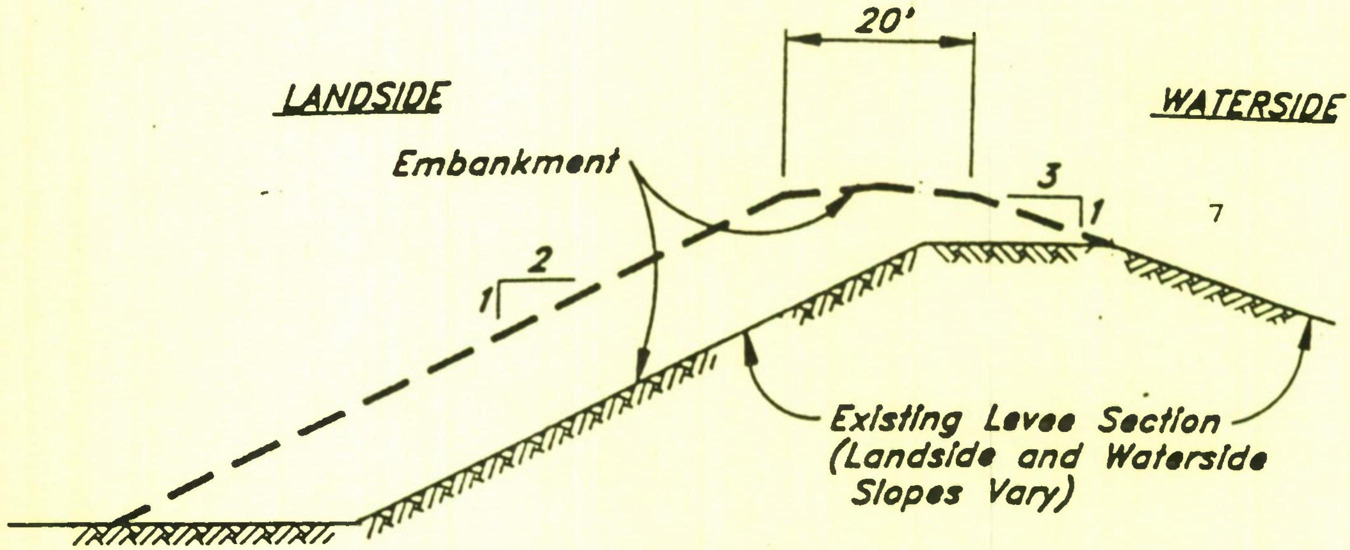
The four alternatives being considered are as follows.

Alternative A - Raise the levee crown and bank (Figure 2). Specific dimensions will vary according to the type of reconstruction required. According to sketches provided by the Corps, addition of fill to the crown may be as much as 5 to 6 feet, and as much as 10 feet of fill may be needed to stabilize the bank. This reconstruction will cover the entire slope of the levee, and permanently cover 13 to 15 feet beyond the existing toe of the levee.

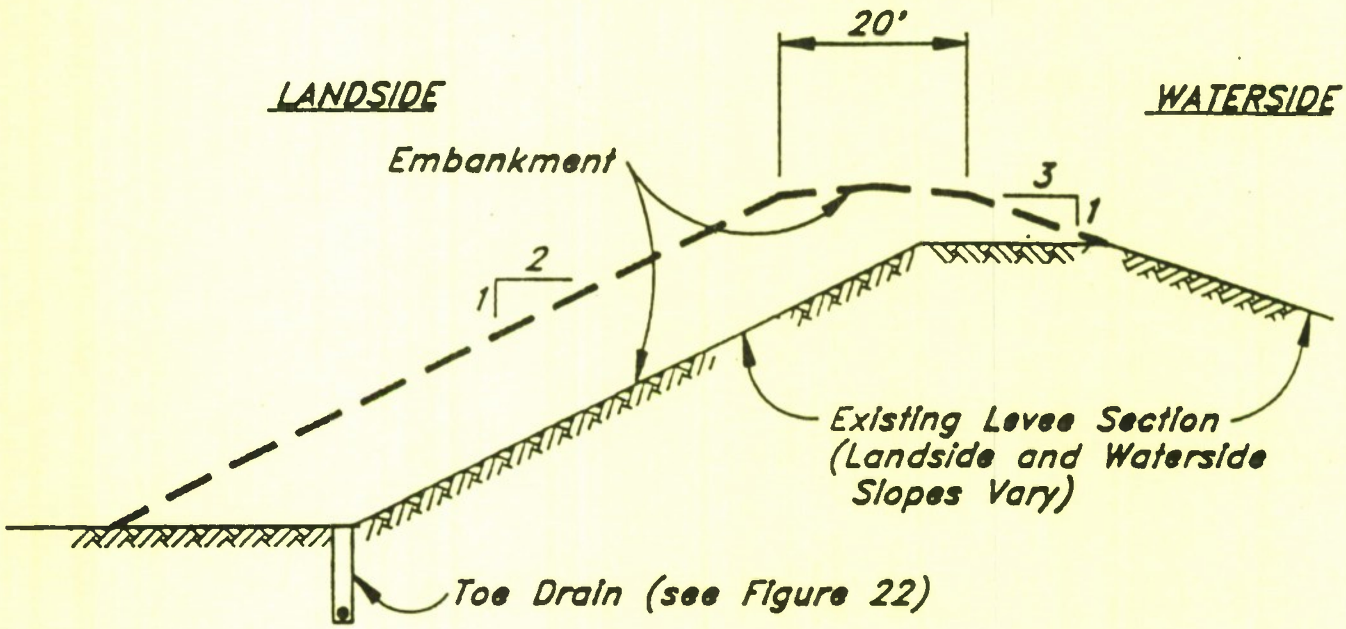
The reconstruction may take place on the waterside or landside of the levee, or it may straddle the levee on both sides. With either alternative, a two-to-one or three-to-one (horizontal to vertical) slope would be maintained. Landside stabilization berms may also be required, extending 15 to 20 feet beyond the toe. According to information provided by the Corps, a total width up to 50 feet may be impacted on each side of the levee, which would encompass berm stabilization and related construction activities at a particular site.

Alternative B - Raise the levee crown and bank, plus installation of a toe drain (Figure 3). Same as alternative A except that toe drains would be constructed in areas where insufficient drainage of the seepage water exists.

Alternative C - Strip cutting of levee (Figure 4). The lower one-half bank of the levee will be strip cut to a depth of approximately 6 inches and reinforced with filter fabric and drainage rock from the bank down to the levee toe. The reinforcement will extend out approximately 15 feet from the toe. An embankment approximately seven feet from the ground would be maintained and gently sloped, forming a berm about 12 feet wide.



TYPICAL SECTION (EMBANKMENT ONLY)



TYPICAL SECTION (WITH TOE DRAIN)

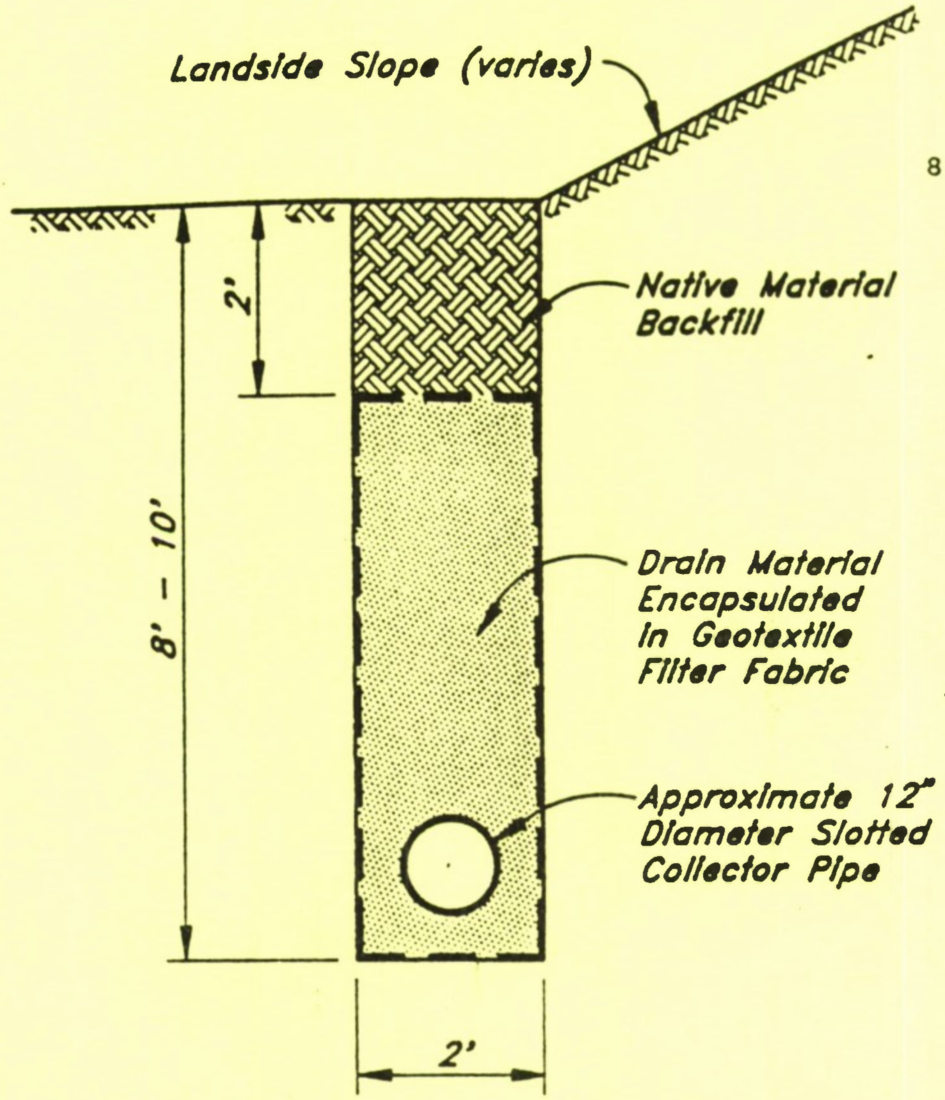
Sacramento River Flood Control
System Evaluation
Marysville/Yuba City Area

REMEDIAL REPAIR

LEVEE EMBANKMENT DETAIL

Figure 2

Sacramento District, Corps of Engineers
November 1989



NOTE:

Seepage water collected in the slotted pipe will require positive drainage which can be accomplished by providing stubout drains or pumps at selected locations.

Sacramento River Flood Control
System Evaluation
Marysville/Yuba City Area

REMEDIAL REPAIR

TOE DRAIN DETAIL

Figure 3

Sacramento District, Corps of Engineers
November 1989

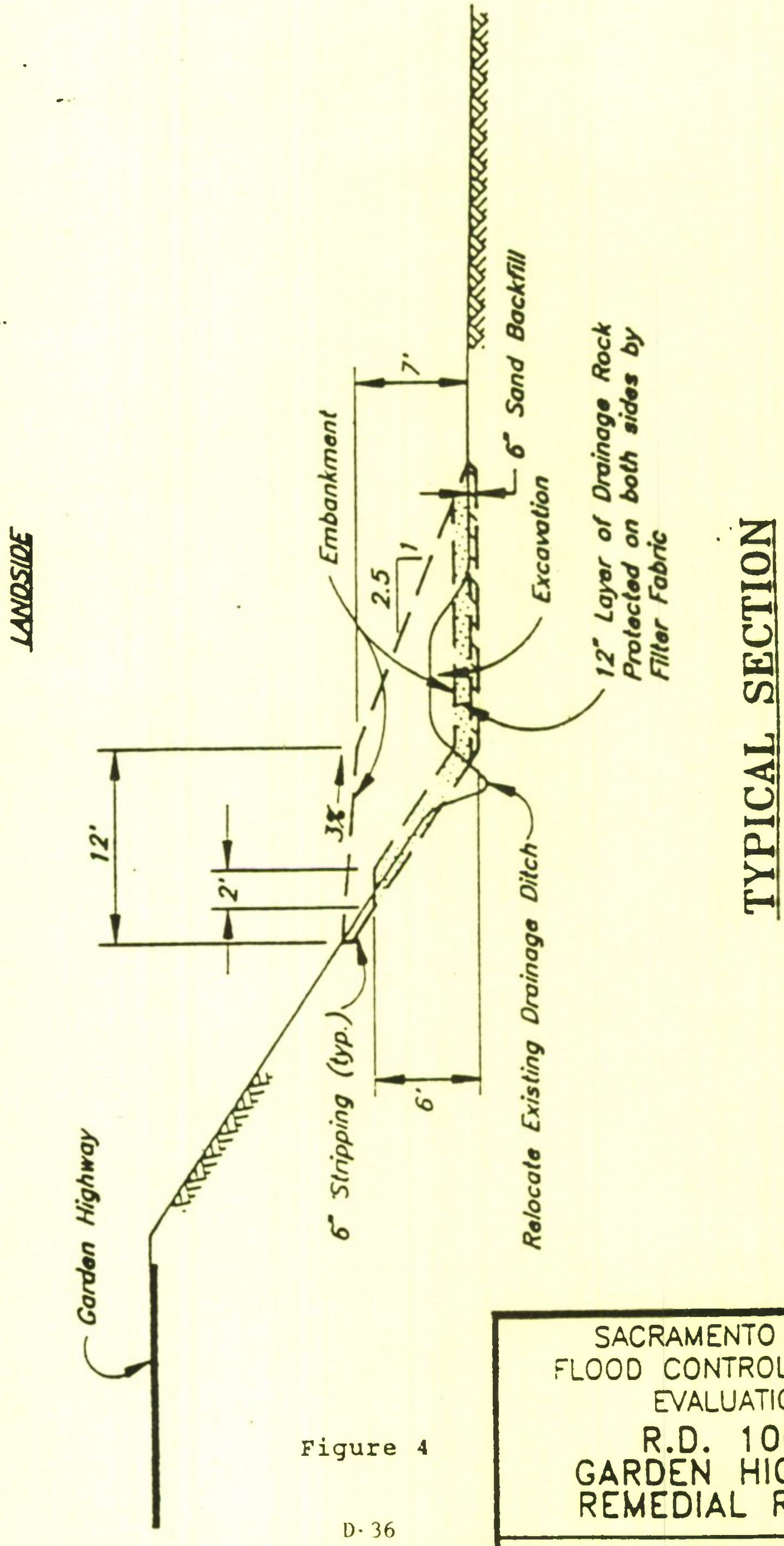


Figure 4

SACRAMENTO RIVER
FLOOD CONTROL SYSTEM
EVALUATION

R.D. 1000
GARDEN HIGHWAY
REMEDIAL REPAIR

SACRAMENTO DISTRICT, CORPS OF ENGINEERS

PREPARED BY: D.A.R.
D[illegible] BY: J.L.M.
DATE: MAY 1988

At the end of this berm, it would be sloped at a two-and-one-half (horizontal) to one (vertical) to the toe of the levee.

<u>Alternative D - Insert a soil or cement bentonite cutoff (slurry) wall within the existing levee (Figure 5).</u> A 3-foot-wide trench would be dug in the center of the levee crown which would extend to the bottom of the levee. This trench would then be filled with the appropriate material to minimize seepage through the levee.

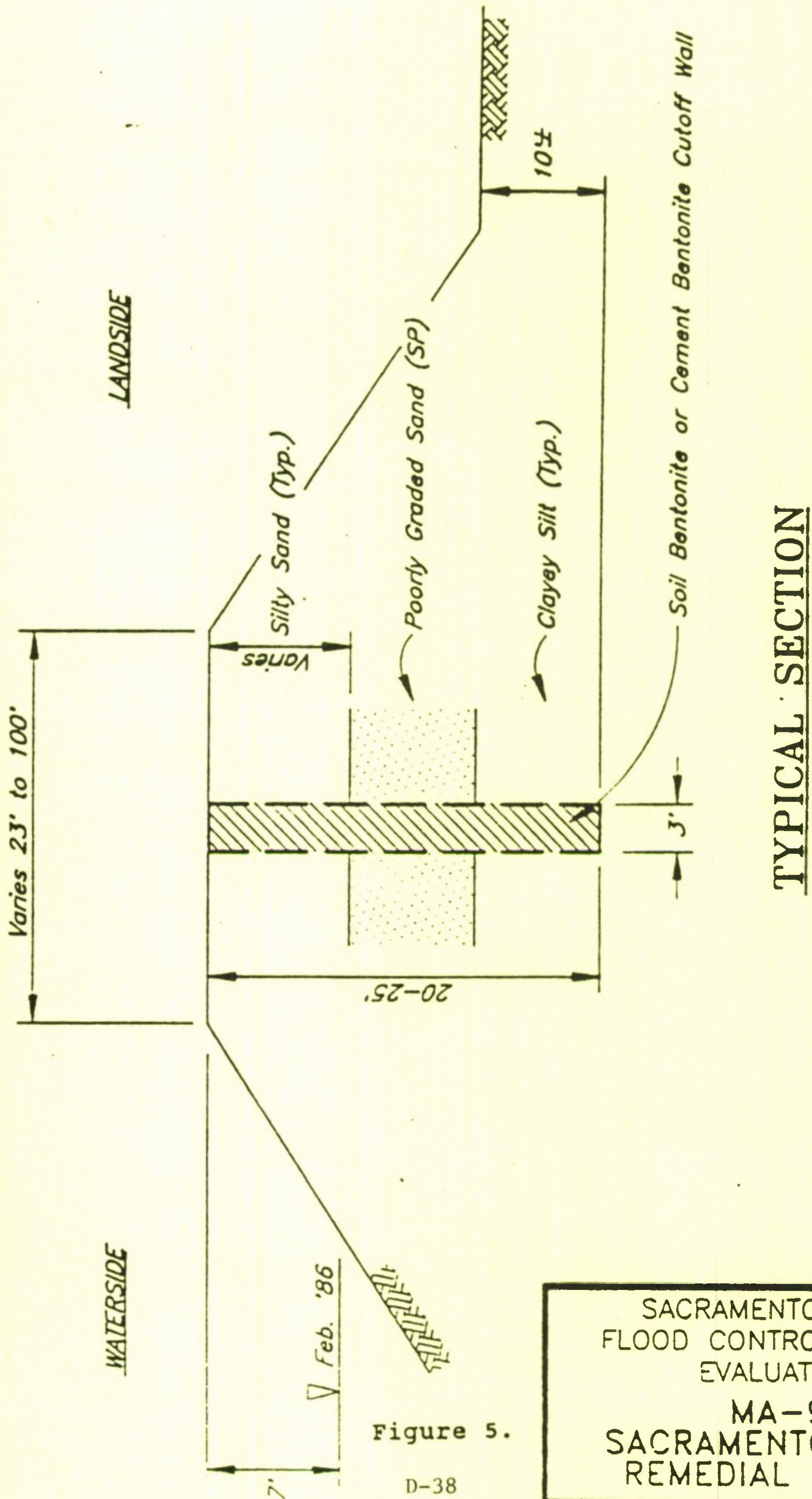


Figure 5.

SACRAMENTO RIVER
FLOOD CONTROL SYSTEM
EVALUATION

MA–9
SACRAMENTO RIVER
REMEDIAL REPAIR

SACRAMENTO DISTRICT, CORPS OF ENGINEERS

PREPARED BY: D.A.R.
DRAWN BY: J.L.M.
DATE: MAY 1988

BIOLOGICAL RESOURCES

Existing Conditions

Vegetation

In the study area, there are essentially five different cover types: a) wetlands/marshes; b) woody riparian; c) scrub/shrub; d) grassy; e) shaded riverine aquatic.

Historically, the constant meandering, seasonal flooding and sediment deposition by the Sacramento River created extensive natural levees, numerous sloughs, islands and marsh areas. Many areas, once covered with extensive riparian forests and lakes which provided diverse habitats, supported high populations of numerous wildlife species. A small percentage of the original acreage now remains, resulting in a narrow and degraded strip of habitat along the river.

Permanent freshwater marshes may be found in several reaches of the Sacramento River and associated sloughs. They are characterized by persistent, dense strands of non-woody emergent vegetation. Common species include cattails, giant bulrush, umbrella sedge, smartweed, iceplant, California hibiscus and marsh pennywort. Marshes provide critical feeding habitat and cover to certain waterfowl, such as surface-feeding and bay ducks, and also to wading birds, such as egrets and herons.

Seasonal marshes or streams are of extremely high value to wildlife. These areas provide valuable cover for feeding, nesting, reproduction and raising of young. Toe drains also provide feeding and reproductive cover for some species.

Shaded riverine aquatic habitat is found along the river where overhanging or submerged vegetation exists, usually along banks which have not been riprapped. By definition, at least 10 horizontal feet of vegetation overhangs the water surface to qualify as shaded riverine aquatic habitat. This provides cooler shaded environment for a portion of the day to fish and other aquatic organisms seeking cover (DeHaven & Weinrich, 1988). Cover of this type may also be provided by uneven bank edges or crevices within the bank, providing cool water habitat for fish. Higher food production may be found in these areas also. Insects which frequent the overhanging vegetation are food for fish. Also, leaf litter and submerged vegetation provide a detritus base for microorganisms. This productive interaction of terrestrial and aquatic environments is consequently a valuable cover type for fish. In the project area, higher quality and total area of shaded riverine aquatic habitat may be found in

sloughs associated with the Sacramento River than the river itself.

In the lower river from Freeport to Collinsville, most levees are bordered by either orchards (e.g., pear, apple), vineyards, or homes located within or outside a municipality. Consequently, in these areas there is very little wildlife habitat available. There are few areas, however, where a fairly wide band (20-30 feet) of riparian vegetation exists. These provide valuable habitat for birds and mammals.

The remaining riparian forest strips along the river contain many native and introduced tree species. The riparian canopy consists primarily of valley oak, sycamore, cottonwood, and large willow. Some of the trees may have grape or mistletoe growing on them. A well-defined woody understory typically consists of box elder, black walnut, white alder, Oregon ash, and smaller cottonwood. California grape, blackberry, raspberry mugwort, western ragweed, pigweed, clover, cocklebur, several thistles, grasses and forbs form an often dense ground cover. Non-native woody species which may be commonly found include eucalyptus, acacia, giant reed and honey locust. Berms along the levee may contain several varieties of grasses, forbs, weeds and small woody species, such as cottonwood or willow. These areas provide valuable habitat for small mammals, such as rabbits and mice, which in turn provide a food base for larger animals, such as coyotes and raptors.

Fish Resources

The Sacramento River supports an array of anadromous and resident fish species. Anadromous fishes of the Sacramento River system in the project area include chinook salmon, steelhead trout, striped bass, American shad and sturgeon. Resident warm water fish include largemouth bass, crappie, catfish, bluegill, tule perch, and sunfish.

Of greatest importance to California fisheries is the chinook salmon. The Sacramento River supports the largest chinook salmon population in the state. Approximately 90 percent of the Central Valley salmon population spawn in this system (Kjelson, 1982). Four genetically distinct species of chinooks presently use the river: fall-, late fall-, winter- and spring-run. Fall-run salmon are most abundant, comprising about 80 percent of the four runs (Kjelson, 1982). Although all runs have experienced a population decline, the winter-run species has experienced the most precipitous decline, and was consequently listed as a threatened species in 1989 under the Endangered Species Act. Documentation of the decline for fall-run chinook is most

extensive, indicating the 1985 population count is about 17 percent of the spawning population in the 1950's (Michny and Deibel, 1986). The segment of the river in the project area is not used for spawning grounds.

Adult steelhead trout use the lower Sacramento River as a migration corridor to and from spawning grounds located upriver. As with chinook salmon, the study area does not contain suitable spawning habitat for steelhead, but does provide downstream migration routes for smolts.

Most of California's shad and striped bass spawn in the Sacramento River system. The American shad population has flourished in the past few years, and is estimated to be several million (FWS, 1976). Striped bass populations, however, are experiencing a decline. In the 1960's the striped bass population for the Sacramento River was estimated to be 3.0 to 4.5 million; in the 1970's the population declined to 1.7 million. In 1977 the population was between 0.8 to 1.2 million (Kohlhorst, 1990). It continues to steadily decline.

White sturgeon populations are also considered unstable. Although population estimates have increased substantially since the 1970's, extreme fluctuation in numbers of fish is of concern. It is estimated that approximately 130,000 fish now reside in the Sacramento River.

Other fish species, including largemouth bass, crappie, bluegill and sunfish, can be found in the study area. These species use river backwater areas where current velocities are slower and more conducive to requirements of the fish. Most species may be found along vegetated shorelines of the river and associated sloughs where valuable cover is provided by overhanging and/or partially submerged shrubs or trees (referred to as shaded riverine aquatic habitat). Fish habitat is substantially enhanced by the diversity offered by this land-water interface and adjacent berms.

Wildlife Resources

Wildlife found on the lower Sacramento River is not as well represented as it was before agricultural development permanently removed much of the natural habitat. Species which were dependent on riparian, oak woodland, marsh and grassland habitats have declined accordingly. Smaller mammal species may now be found along the lower portion of the river. Audubon cottontail, brush rabbit, blacktail hare, gray squirrel, red and grey foxes, bobcat, raccoon, opossum, mink, weasel, striped and spotted

skunks, badger, muskrat, river otter and beaver are represented, depending on the area.

Common bird species which may be found include California quail, ring-necked pheasant, mourning dove, band-tailed pigeon, common merganser, mallard, herons, egrets, kingfisher, marsh wren, song sparrow, various owls, woodpeckers, red-tailed hawk and Swainson's hawk. A complete list of bird species which have been historically sighted along the Sacramento River is included in the appendix.

Amphibians and reptiles which may be found along the river include gopher snake, western fence lizard, garter snake and Pacific tree frog.

Endangered Species

At least three plant and/or animal species, listed as threatened or endangered, may be found along the lower Sacramento River.

Winter-run chinook salmon (Oncorhynchus tshawytscha) has been recently emergency listed as threatened by the National Marine Fisheries Service. Adverse impacts could also be sustained by this species if waterside construction disturbed shaded riverine aquatic habitat or increased turbidity in the river.

The valley elderberry longhorn beetle is a federally-listed threatened invertebrate species which may be found in the project area. At least three sites along Sutter Slough (rivermiles 24.7L, 24.6R, and 25.2R) contain elderberries, the host plant for the beetle. There are undoubtedly other areas which have extant populations of the plant. Adverse impacts to the beetle could occur if construction activities disturbed any of the plants.

The palmate-bracted bird's beak (Cordylanthus palmatus) is a plant which is a federally-listed threatened plant. It may be found in the project area.

Table 1 lists candidate species (those species in which federal listing is pending) may also be found in the project area.

Table 1. List of candidate species found within the project area.

Birds[1]

ferruginous hawk (*Buteo regalis*)
white-faced ibis (*Plegadis chihi*)
tri-colored blackbird (*Agelaius tricolor*)

Fish

Sacramento splittail (*Pogonichthys macrolepidotus*)
Delta smelt (*Hypomesus transpacificus*)

Amphibians

California tiger salamander (*Ambystoma tigrinum* spp.)
California red-legged frog (*Rana aurora draytoni*)

Reptiles

giant garter snake (*Thamnophis couchi gigas*)

Mammals

San Joaquin pocket mouse (*Perognathus inornatus*)
San Joaquin woodrat (*Neotoma fuscipes riparia*)

Plants

California hibiscus (*Hibiscus californicus*)
Suisun aster (*Aster chilensis* var. *lenthus*)
Delta tule-pea (*Lathyrus jepsonii* spp. *jepsonii*)
Mason's lilaeopsis (*Lilaeopsis masonii*)

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[1] Swainson's hawk, a state-listed threatened bird, also makes its nesting habitat in several areas of the lower Sacramento River from early March to August.

IMPACTS OF ALTERNATIVES

The following section is a general discussion of the significant impacts anticipated from the individual alternatives as provided by the Corps.

Alternative A - Raise levee crown and slope

The proposed raising of the levee (5 to 6 feet) and construction of a stabilizing berm would adversely affect grasses and other herbaceous vegetation growing on the existing levee slope and beyond the toe of the berm (approximately 50 feet). Depending on the location of the work (landside, waterside or straddle), the impacts would differ greatly.

Waterside construction would adversely affect shaded aquatic riverine habitat, riparian vegetation, and grasses along the levee slope. Any adverse effect on shaded aquatic riverine and riparian habitat would adversely impact anadromous fish (adults and smolts) and resident fish species. Loss of these habitat types would reduce cover and food for fish, and nutrient input to the aquatic system. Any adverse effect on anadromous fish would be significant because Sacramento River populations are already severely depressed.

The loss of riparian vegetation along the river would adversely affect many wildlife species. The riparian forest, with its multi-layered vegetation and high plant species density, supports the largest populations and most diverse wildlife along the Sacramento River. The high diversity of tree growth, cover conditions and layers, and close proximity to water provide a wide variety of easily accessible habitats and niches. Any loss of plant diversity would adversely affect those species inhabiting the area.

Any disturbance and loss of riparian vegetation, and construction activity would adversely affect nesting raptors, including the Swainson's hawk. Loss or disturbance of nesting habitat could severely impact these species.

The impact on grassland habitat on the levee slopes would be minimal and temporary. Disturbance or loss of this habitat would adversely impact some small mammals, raptors, and other species. However, grasses should recover to preproject conditions within two to three years after project construction and the area repopulated by similar wildlife species.

Landside construction would impact grasses on the levee slopes, trees and shrubs growing and along the levee, and wetland

habitats along existing toe drains. In areas where orchards are adjacent to construction sites, impacts may be sustained by losses of some of the fruit trees, which are used by perching birds. Also, construction activity during raptor nesting periods could lead to the failure of nesting success.

The impacts on fish, wildlife and vegetation would be significantly reduced with landside construction. It would primarily eliminate or reduce any adverse project effects on riparian vegetation and shade riverine aquatic habitat.

Straddle construction impacts could limit most of the losses to the grassy levee slopes, some riparian vegetation, and trees and shrubs found immediately adjacent to the levee toe. Also, depending on the locations of the toe drains, impacts could be reduced or eliminated to wetland habitats. The impacts to shaded riverine aquatic habitat could occur; however, they should be significantly less than with the waterside construction alternative.

Any loss of shaded riverine aquatic and riparian habitats would have a significant adverse impact on anadromous fish, raptors, songbirds, small mammals and other species that use these areas to meet part or all of their life needs. Cover and food sources for anadromous and resident fish would be lost, nesting habitat for raptors would be eliminated or greatly reduced. Construction activity during raptor nesting periods can also result in reduced nesting success. Cover and nesting habitat for songbirds would be lost, and cover, food and a portion of the migration corridor for small mammals would be eliminated.

If a landside berm is constructed with straddle construction, the impacts would be similar to landside construction.

A significant amount of borrow material would be required to raise and reinforce the levees. The impacts on vegetation and wildlife could be adverse. However, the magnitude of the impacts would vary with site location and amount of borrow material required.

<u>Alternative B - Raise levee crown, reconstruct levee slope, and install toe drain.</u>

The impacts of this alternative would be similar to those of Alternative A, except for the construction of toe drains. The impacts of the toe drain would vary, depending on its location and whether it is covered or not. An open toe drain would provide a protected area for wildlife (depending on how it is maintained), especially in areas presently farmed. If water is

allowed to drain naturally into a drainage ditch at the toe, and the water flow is directed to a nearby pond, wildlife values could be enhanced. The drainage ditch and bordering vegetation, if allowed to grow could provide excellent cover for nesting and feeding. This type of drainage arrangement is preferred over culverting the seepage water and transporting it underground. A covered toe drain would have no wildlife value.

Alternative C - Reconstruct levee by strip cutting.

This alternative would involve the removal of grasses along the lower one-half of the levee slope on the landside of the levee and the removal of any vegetation including trees and shrubs along and adjacent to the toe of the levee (50 feet from toe). Existing toe drains and seeps could be eliminated with the construction of the berm. The stripped section of the levee would be covered with filter cloth and compacted soil, and reseeded. The area would be expected to recover in one or two years.

Habitat for small mammals, songbirds, raptors and other animal species are expected to be disturbed or degraded. The impacts, however, could be significant if toe drains or seeps are covered. Wildlife species inhabiting these areas would be displaced and eventually lost if the toe drains are not replaced. The magnitude of the impact, however, would vary depending on work site location, and the vegetative growth at each specific site. Also, as stated previously, raptor nesting success could be reduced if construction activity is underway during the nesting period.

Alternative D - Insert a soil or cement bentonite cutoff (slurry) wall within the existing levee.

This alternative should have only minimal adverse effects on vegetation and wildlife of the area. Since construction would occur on top of the levee, little or no disturbance of wildlife habitat (aquatic habitat, riparian vegetation, toe drain, seeps) would occur. However, construction activity could adversely affect raptor nesting success if it is conducted during the nesting periods.

Location of the staging areas could have an adverse impact on vegetation and wildlife if they are located in sensitive areas. Also, spoil disposal could negatively impact wildlife habitat, depending on the disposal site. Disposal should be done in accordance to guidelines provided by the Service and the California Department of Fish and Game.

DISCUSSION

The Fish and Wildlife Service makes mitigation recommendations based on the value of the project site to fish and wildlife species. During impact assessment, distinct habitat types which may be impacted by the project area are identified. Evaluation species which utilize each habitat type are selected for impact analysis. Evaluation species selection is often based on a rationale including: 1) species known to be sensitive to specific land and water use actions (but not federally listed threatened and endangered species), 2) species that perform a key role in nutrient cycling or energy flows, 3) species that utilize a common environmental resource, or 4) species that are associated with Important Resource Problems as designated by the Director of the Fish and Wildlife Service, such as anadromous fish and migratory birds.

Habitat value determinations are based on the importance of the habitat found in the project area to the selected evaluation species and the relative scarcity of the habitat types. Habitat values can range from those considered to be unique and irreplaceable to those believed to be of relatively low value to fish and wildlife.

Of all the habitat types available to wildlife, riparian habitat supports the greatest diversity and abundance of wildlife species. Unfortunately, much of the riparian habitat necessary to maintain fish and wildlife resources has been eliminated in the project area. Instream aquatic habitat in the project area is also becoming scarce. The loss of these habitat types can be attributed to numerous flood control and water storage projects, water diversions, agricultural expansion, urbanization, and pollution.

The evaluation species selected to determine the value of riparian vegetation in the project area include water-associated birds, passerine birds, and small and large mammals which inhabit the project area. Riparian vegetation in the project area provides important nesting, resting and/or feeding habitats for raptors, passerine and water-associated birds. The riparian corridor provides a high-value feeding habitat and migration corridor to mammal species which may occur in the project area. The riparian corridor is also of high value to chinook salmon and other anadromous fish of the Sacramento River because of the importance of vegetation in providing cover, water, temperature control, a food source, and nutrient input into the ecosystem. Because of the high value of riparian habitats in the project area to fish and wildlife species, and due to the relative scarcity of these habitat types, our goal is no net loss of in-kind habitat value.

The fish evaluation species selected to determine the value of instream aquatic habitat in the project area include chinook salmon (excluding winter-run), steelhead trout, and other resident and anadromous species. The project site from River Mile 0 to 47 is the principal migratory route for anadromous fish of the Sacramento River. Therefore, the protection of instream aquatic habitat becomes extremely important in maintaining, and possibly enhancing the anadromous fish resource.

Because of the high value of instream aquatic habitats in the project area to fish and wildlife evaluation species, and because of the relative scarcity of these habitat types, our mitigation goal is no loss of in-kind habitat value. Under this mitigation goal, we will seek in-kind replacement of lost habitat values.

The evaluation species selected to determine the value of permanent and seasonal wetlands, toe drains, and associated canals in the project include migratory waterfowl and other water-associated birds, reptiles and amphibians that frequent these areas. Seasonal wetlands provide important wintering habitat for waterfowl. As the number of permanent wetlands in the Central Valley diminishes, seasonal wetlands assume an added importance for these species. Seasonal wetlands are also becoming scarce as agricultural expansion and urban growth continues.

Because of (1) the importance of permanent and seasonal wetland areas to migratory waterfowl and other water-associated birds, (2) their protection under the Migratory Bird Treaty Act, and (3) the relative scarcity of this habitat in the region, our mitigation goal is no net loss of in-kind habitat value. Under this mitigation goal, we will seek in-kind replacement of lost habitat values.

The evaluation species selected to determine the value of grasslands include raptors and small mammals that inhabit the areas. Because this habitat type is still fairly common throughout the region and in the state, we recommend that no net loss of habitat value occur, while minimizing loss of in-kind habitat value.

To minimize the impacts of the project to fish and wildlife resources, we recommend that <u>Alternative D</u> be selected for further investigation or implementation to provide flood protection for the Phase IV project area. This alternative would have the least damaging environmental impact of all the alternatives being investigated. Disruption of landside and waterside vegetation and wildlife habitat would be minimal. Staging areas, although impacted would recover quickly with reseeding.

<u>Alternative C</u>, although less desirable than Alternative D, would have less adverse impact on biological resources than Alternatives A and B. Although disturbance of vegetation would occur on the lower one-half of the levee slope and the toe drain and nearby areas, the area is expected to recover quickly if revegetation efforts are included. Also, if an open toe drain is included as part of the project, wildlife habitat values would increase.

The impacts of <u>Alternatives A and B</u> would be similar except for the inclusion of a toe drain with Alternative B. From an environmental viewpoint, Alternatives A and B with straddle or landside construction would be significantly less damaging than waterside construction. Alternative A with waterside construction would be the least desirable of all the alternatives presently under investigation.

To avoid any adverse impact on valuable riparian vegetation, instream aquatic habitat, and wetlands in the project area, we recommend that alternatives which impact these habitat types not be implemented. If, however, impacts to these habitats are unavoidable, impact determinations and mitigation requirements will be accomplished through the use of the Services's Habitat Evaluation Procedures (HEP).

To mitigate adverse impacts to riparian vegetation, an area of sufficient size (as determined by the HEP) should be provided for management. Plantings of indigenous riparian species (trees and shrubs) will be required in the area to gain riparian habitat values. Estimated costs to replace riparian vegetation is $25,000 per acre, excluding land acquisition and maintenance costs. Irrigation (drip system) would be required for a minimum of at least 6 years, or until the plantings are well established and self-sustaining. Any dead or decadent trees and shrubs would be replaced and maintained until well established. A detailed monitoring study would be required for a period of 10 years after the 6 year establishment period to determine the success of the plantings.

To offset the loss of instream aquatic habitat values, a planting program, coordinated with riparian plantings, would be required. Dense plantings of select indigenous trees and shrubs would be required in the river and along the bank to provide overhanging cover and exposed tree and shrub roots. This, in conjunction with the placement of tree trunks and tree root balls anchored to the river bank, may be necessary.

The loss of wetland vegetation along the toe drain and seeps can be offset through the construction of new toe drains and ponding

areas. To further minimize the loss, toe drain construction should be initiated, water provided, and vegetation planted (transplant from old drain), at least 6 months prior to covering old toe drains and seeps. This would essentially eliminate any adverse impact on this habitat type.

Any trees and shrubs removed along the landside toe of the levee and adjacent areas would require replacement. Mature trees and shrubs should be replaced at a ratio of at least five-to-one. All plantings will require watering and maintenance for a minimum of 6 years. The most efficient watering method is the drip system.

Any loss of grassland habitat values due to project construction can be offset by seeding the disturbed areas and newly created berms with native grasses and forbs. Seeding should be conducted just prior to the rainy season. This would allow sufficient germination and establishment of these species.

RECOMMENDATIONS

We recommend that:

1. Funding be provided so that the Fish and Wildlife Service can prepare a Section 2(b) Fish and Wildlife Coordination Act report for your next phase of planning for this project.

2. Based on overall impacts to fish and wildlife habitat values, Alternative D be selected for further investigation or implementation to provide flood protection to the Phase IV project area. From an environmental viewpoint, we believe Alternative D would have the least adverse effect on fish and wildlife followed by Alternatives C, B and A. With regard to waterside, landside and straddle construction, we believe waterside construction would be the most detrimental of the three, followed by landside and straddle construction. Waterside construction should be avoided.

3. To mitigate any adverse impacts of the proposed alternatives on riparian vegetation, instream aquatic habitat, wetland vegetation grassland, and landside trees and shrubs, measures as indicated in the Discussion Section would be required.

The impact determination and mitigation requirements will be through the use of the Service's Habitat Evaluation Procedure.

Cost to conduct the procedure will be determined after selection of a flood control alternative and specific work sites.

4. To avoid construction activity impacts (only alternatives that would not impact riparian vegetation) to Swainson's hawk and other raptors, construction be limited to the late March to early August period.

5. To minimize the loss of wetland vegetation (toe drains, seeps) with project construction, open toe drains be included in lieu of culverts. Toe drains be designed to allow growth of wetland and other vegetation in and adjacent to the drain. Also, as a possible enhancement measure, depressions be excavated in adjacent farmlands and drain water be directed to these areas. This would promote the growth of wetland and other vegetation.

Additional Studies

6. If waterside construction is proposed for the Sacramento River and associated sloughs, the following studies should be conducted:

a. Surveys of existing winter-, spring-, fall- or late fall-run salmon as well as other anadromous fishes. Included in the survey should be a determination of value of aquatic habitat (shaded riverine aquatic) along the river or contiguous slough.

b. Population surveys done for species of special concern, including federally and State listed Species and candidates for listing. The surveys would include evaluating nesting sites and territories.

7. Should the Corps determine that federally listed species are likely to be adversely affected by the proposed action, consultation pursuant to Section 7 of the Endangered Species Act of 1973, as amended, should be initiated with the appropriate resource agency.

We appreciate the opportunity to provide input to your planning process. For further assistance regarding this letter, please

contact wildlife biologist Lonn Maier of my staff at (916) 978-4613.

Sincerely,

Wayne S. White
Field Supervisor

cc: ARD (FWE) FWS, Portland, OR
Reg. Mgr. Region II, Rancho Cordova
NMFS, Santa Rosa

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APPENDIX 1

BIRD SPECIES SEEN ALONG THE SACRAMENTO RIVER

The following list of bird species represents a cumulation of observations over many years. Some species may be more commonly sighted than others, depending on time of year and populations of the species.

COMMON NAME	SCIENTIFIC NAME
Common Loon	Gavia immer
Arctic Loon	Gavia arctica
Red-throated loon	Gavia stellata
Red-necked grebe	Podiceps grisegena
Horned grebe	Podiceps auritus
Eared grebe	Podiceps nigricollis
Western grebe	Aechomophorus occidentalis
Pied-billed grebe	Popilymbus podiceps
White pelican	Pelecanus erythrorhynchos
Double-crested cormorant	Phalacrocorax auritus
Great blue heron	Ardea herodius
Great egret	Casmerodius albus
Snowy egret	Egretta thula
Black-crowned night heron	Nycticorax nycticorax
Least bittern	Ixobrychus exilis
American bittern	Botaurus lentiginosus
White-fronted goose	Anser albifrons
Snow goose	Chen caerulescens
Ross goose	Chen rossi
Mallard	Anas platyrhynchos
Gadwall	Anas strepera
Pintail	Anas acuta
Green-winged teal	Anas crecca
Blue-winged teal	Anas discors
Cinnamon teal	Anas cyanoptera
American widgeon	Anas americana
Northern shoveler	Anas clypeata
Wood duck	Aix sponsa
Redhead	Aythya americana
Ring-necked duck	Aythya collaris
Canvasback	Aythya valisineria
Greater scaup	Aythya marila
Lesser scaup	Aythya affinis
Common goldeneye	Bucephala clangula
Barrow's goldeneye	Bucephala islandica
Bufflehead	Bucephala albeola

Ruddy duck	Oxyura jamaicensis
Hooded merganser	Lophodytes cucullatus
Common merganser	Mergus merganser
Turkey vulture	Cathartes aura
White-tailed kite	Elanus leucurus
Goshawk	Accipiter gentilis
Sharp-shinned hawk	Accipter striatus
Cooper's hawk	Accipiter cooperii
Red-tailed hawk	Butoe jamaicensis
Red-shouldered hawk	Buteo lineatus
Swainson's hawk	Buteo swainsoni
Rough-legged hawk	Buteo lagopus
Ferruginous hawk	Buteo regalis
Golden eagle	Aquila chrysaetos
Bald eagle	Haliaeetus leucocephalus
Northern harrier	Circus cyaneus
Osprey	Pandion haliaetus
Prarie falcon	Falco mexicanus
Peregrine falcon	Falco peregrinus
Merlin	Falco columbarius
American kestrel	Falso sparuerius
California quail	Lophortyx californicus
Ring-necked pheasant	Phasianus colichicus
Sandhill crane	Grus canadensis
Virginia rail	Rallus limicola
Sora	Poranza carolina
Common gallinule	Callinula chloropus
American coot	Fulica americana
Semipalmated plover	Charadrius alexandrius
Killdeer	Charadrius vociferus
Mountain plover	Charadrius montanus
American golden plover	Pluvialis dominica
Black-bellied plover	Pluvialis squatorola
Common snipe	Capella gallinago
Long-billed curlew	Numenius americanus
Whimbrel	Numenius phaeopus
Spotted sandpiper	Actitis macularis
Solitary sandpiper	Tringa solitaria
Willet	Catoptrophorus semipalmatus
Greater yellowlegs	Tringa melanoleuca
Lesser yellowlegs	Tringa flavipes
Baird's sandpiper	Calidris bairdii
Least sandpiper	Calidris minutilla
Dunlin	Calidris alpina
Long-billed dowitcher	Limnodromous scolopaceus
Western sandpiper	Calidris mauri
Marbled godwit	Limosa fedoa
American avocet	Recurvirostra americana
Black-necked stilt	Himantopus mexicanus
Herring gull	Larus argentatus

California gull	Larus californicus
Mew gull	Larus canus
Bonaparte's gull	Larus philadelphia
Forster's tern	Sterna forsteri
Caspian tern	Hydroprogne caspia
Black tern	Childonias niger
Band-tailed pigeon	Columba fasciata
Rock dove	Columba livia
Mourning dove	Zenaidura macroura
Barn owl	Tyto alba
Screech owl	Otus asio
Great horned owl	Bubo virginianus
Burrowing owl	Speotyto cunicularia
Long-eared owl	Asio otus
Short-eared owl	Asio flammeus
Saw-whet owl	Aegolius acadicus
Poorwill	Phalaenoptilus nuttallii
Lesser nighthawk	Chordeiles acutipennis
Vaux's swift	Chaetura vauxi
White-throated swift	Aeronautes saxatalis
Black-chinned hummingbird	Archilochus alexandri
Anna's hummingbird	Calypte anna
Rufous hummingbird	Selasphorus rufus
Allen's hummingbird	Selasphorus sasin
Calliope hummingbird	Stellula calliope
Belted kingfisher	Megaceryle alcyon
Common flicker	Colaptes auratus
Acorn woodpecker	Melanerpes formicivorus
Lewis woodpecker	Asyndemus lewis
Yellow-bellied sapsucker	Sphyrapicus varius
Hairy woodpecker	Dendrocopos villosus
Downy woodpecker	Dendrocopus pubescens
Nuttall's woodpecker	Dendrocopus nuttalli
Western kingbird	Tyrannus verticalis
Ash-throated flycatcher	Myiarchus cinerascens
Black phoebe	Sayornis nigricans
Say's phoebe	Sayornis saya
Willow flycatcher	Empidonax traillii
Western flycatcher	Empidonax difficilis
Western wood pewee	Contopus sordidulus
Olive-sided flycatcher	Nuttallornis borealis
Vermilion flycatcher	Pyrocephalus rubinus
Horned lark	Eremophila alpestris
Violet-green swallow	Tachycineta thalassina
Tree swallow	Iridoprocne bicolor
Bank swallow	Riparia riparia
Rough-winged swallow	Stelgidopteryx ruficollis
Barn swallow	Hirundo rustica
Cliff swallow	Petrochelidon pyrrhonota
Purple martin	Progne subis

Steller's jay	*Cyanocitta stelleri*
Scrub jay	*Aphelocoma coerulescens*
Yellow-billed magpie	*Pica nuttalli*
Common raven	*Corvus corax*
Common crow	*Corvus brachyrhynchos*
Black-capped chickadee	*Parus atricapillus*
Mountain chickadee	*Parus gambeli*
Plain titmouse	*Parus inornatus*
Bushtit	*Psaltriparus minimus*
Water pipit	*Anthus spinoletta*
Cedar waxwing	*Bombycilla cedrorum*
Phainopepla	*Phainopeple nitens*
Loggerhead shrike	*Lanius ludovicianus*
Starling	*Sturnus vulgaris*
Hutton's vireo	*Vireo huttoni*
Solitary vireo	*Vireo solitarius*
Orange-crowned warbler	*Vermivora celata*
Nashville warbler	*Vermivora ruficapilla*
Yellow warbler	*Dendroica petechia*
Yellow-rumped warbler	*Dendroica coronata*
Black-throated gray warbler	*Dendroica nigriscens*
Townsend's warbler	*Dendroica townsendi*
Black-throated blue warbler	*Dendroica caerulescens*
Black-throated green warbler	*Denroica virens*
Hermit warbler	*Dendroica occidentalis*
MacGillivray's warbler	*Oporonis tolmiei*
Common yellowthroat	*Geothlypis trichas*
Yellow-breasted chat	*Icteria virens*
Wilson's warbler	*Wilsonia pusilla*
House sparrow	*Passer domesticus*
Western meadowlark	*Sturnella neglecta*
Yellow-headed blackbird	*X. xanthocephalus*
Red-winged blackbird	*Agelaius phoeniceus*
Tri-colored blackbird	*Agelaius tricolor*
Hooded oriole	*Icterus cucullatus*
Brewer's blackbird	*Euphagus cyanocephalus*
Brown-headed cowbird	*Molothrus ater*
Western tanager	*Piranga lucoviciana*
Black-headed grosbeak	*Pheucticus melanocephalus*
Blue grosbeak	*Guiraca caerulea*
Lazuli bunting	*Passerina amoena*
Purple finch	*Carpodacus purpureus*
House finch	*Carpodacus mexicanus*
Pine siskin	*Spinus pinus*
American goldfinch	*Spinus tristis*
Lesser goldfinch	*Spinus psaltria*
Lawrence's goldfinch	*Spinus lawrencei*
Rufous-sided towhee	*Pipilo erythrophthalmus*
Brown towhee	*Pipilo fuscus*
Savannah sparrow	*Passerculus sandwichensis*

Vesper sparrow	Pooecetes gramineus
Lark sparrow	Chondestes grammacus
Rufous-crowned sparrow	Aimophila ruficeps
Sage sparrow	Amphispiza belli
Dark-eyed junco	Junco hyemalis
Chipping sparrow	Spizella passerina
White-crowned sparrow	Zonotrichia leucophrys
Golden-crowned sparrow	Zonotrichia atricapilla
White-throated sparrow	Zonotrichia albicollis
Fox sparrow	Passerella iliaca
Lincoln's sparrow	Melospiza lincolnii
Song sparrow	Melospiza melodia

Source: USFWS, 1976

United States Department of the Interior

FISH AND WILDLIFE SERVICE

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2800 Cottage Way, Room E-1803
Sacramento, California 95825-1846

July 23, 1990

Colonel Jack A. Le Cuyer
District Engineer
Sacramento District, Corps of Engineers
650 Capitol Mall
Sacramento, California 95814

Subject: CE - Sacramento River Flood Control System Evaluation, Phase V

Dear Colonel Le Cuyer:

This letter is provided pursuant to the scope of work for fiscal year 1990. It describes (1) the fish and wildlife resources of the middle and upper Sacramento River from Knight's Landing (River Mile 90) to Vina (River Mile 220), Butte Creek, Cherokee Canal, Mud Creek, Sycamore Creek, and Deer Creek; and (2) the potential impacts of the remedial levee repairs presently under investigation by Corps of Engineers on these resources.

The information provided herein is preliminary in nature, and is provided as technical assistance to your planning process. It does not constitute our detailed report as is required by Section 2 of the Fish and Wildlife Coordination Act.

Our recommendations provided herein are based on mitigation and compensation commensurate with the fish and wildlife values involved and adhering to the sequential levels identified by the Council on Environmental Quality.

This analysis is based on project information provided by the Corps of Engineers prior to March 15, 1990 and field investigation conducted during May, 1990.

This letter has been coordinated with the California Department of Fish and Game and the National Marine Fisheries Service. All preliminary information presented herein regarding endangered, threatened and candidate species has been coordinated with our Habitat Conservation staff.

INTRODUCTION

The Sacramento River Flood Control Project, authorized by the Flood Control Act of 1960, consists of approximately 1000 miles of levees plus overflow weirs, pumping plants and bypass channels that protect communities and agricultural lands in the Sacramento Valley and Sacramento - San Joaquin Delta (Jones and Stokes, 1987). The present Corps of Engineers levee system evaluation is being conducted to determine the long-term integrity of the flood control system for the Sacramento River and its tributaries. It was initiated because of the 1986 flood event which severely stressed the existing levee system in the study area, caused some levee failures, and hence, raised the question of levee reliability.

The Sacramento River Flood Control System Evaluation, authorized by the Energy and Water Development Appropriation Act of 1987, is divided into five phases:

Phase I - Levees in the Sacramento Urban Area. The initial appraisal report was completed in 1988, and construction of remedial repairs is expected to begin in 1990.

Phase II - Both banks of the Feather River. Levees around Marysville/Yuba City, Wadsworth Canal, Sutter Bypass, and a portion of Bear River.

Phase III - Levees along Yankee Slough, Bear River, north levee of the Natomas Cross Canal, lower Feather River, south levee of Tisdale Bypass, Sutter Bypass, right bank of Sacramento River from Tisdale Bypass to Knight's Landing Ridge Cut, east levee Yolo Bypass between Sacramento Bypass and Fremont Weir, west levee Yolo Bypass between Putah Creek and Fremont Weir, Cache Creek, Willow Slough Bypass, and Putah Creek levees.

Phase IV - Right and left bank levees along the Sacramento River from Freeport south to the Delta (at Collinsville). All Sacramento River Flood Control Project levees in the Delta.

Phase V - Left bank Sacramento River from Tisdale Bypass to Knight's Landing Ridge Cut. Both banks Sacramento River from Tisdale Bypass north to Vina. Levees along Cherokee Canal, Butte Creek, Sycamore Creek, Mud Creek, and Deer Creek.

This evaluation includes only the areas identified in Phase V. The Phase V project area will be surveyed by the Corps in the fall of 1990 to identify levees which do not meet existing design requirements originally authorized by Congress.

DESCRIPTION OF THE AREA

The Sacramento River system is the largest watershed in California, draining 26,300 square miles of the Central Valley, the Coast, Cascade and the Sierra Nevada mountain ranges. A system of levees bounds much of the Sacramento River downstream from Chico Landing to the Delta. Flows are regulated by major dams and reservoirs, such as Shasta on the mainstem river and

Whiskeytown, Oroville, New Bullards Bar, Folsom, Black Butte, and Berryessa on the tributaries. In addition, water is transferred from the Trinity River to the Sacramento River via Whiskeytown and Keswick Reservoirs. Since the construction of these storage facilities, the river is used to transport this water to the Sacramento - San Joaquin Delta and the State and Federal export pump facilities. The sustained high-water level during the summer months, although controlled by upstream developments, contributes to some streambank erosion. The major factor contributing to the erosion of riverbanks, however, is winter flood flows. This has been attenuated due to decreasing annual precipitation and subsequent low flows for the past four years. Two thousand square miles of fertile agricultural land and about fifty communities are located in the system's floodplain. Figure 1 shows the study area from Knight's Landing to Vina and lower sections of associated tributaries.

Prior to encroachment by man upon the Sacramento River, the area from Chico Landing to Collinsville was bordered by natural levees or intermittent high banks covered with riparian forests of varied characteristics. The forests included trees of all sizes, ranging from shrub to valley oak and sycamore 75 to 100 feet high, growing closely in irregular groves or belts on most of the natural levees. These groves were as much as 5 miles wide on the Sacramento River and generally about 2 miles wide on the tributaries.

At the turn of the century, it is estimated that there were about 470,000 acres of riparian woodlands and associated plant communities along the 184 miles of the Sacramento River between Chico and Collinsville. By the 1970's, the woodlands were reduced to about 1 percent of the estimated acreage in riparian woodlands and associated communities existing 90 years prior to this time (USFWS, 1976). Most of the loss was and is currently due to agricultural conversions, with other losses due to bank protection, dam and levee construction, water diversions, and timber and fuelwood harvesting.

Presently, the Colusa to Red Bluff river reach (River Mile 145 to 243) contains the most substantial remnants of the Sacramento Valley's riparian forest, estimated at 14,000 acres (SRA, 1989; USFWS, 1987). The river is allowed to meander and is constrained mainly by setback levees between Colusa and Chico Landing; above this reach the river is generally unleveed. A long history of stream channel migration through alluvial deposits creates and maintains the dynamic processes which support the surrounding riparian vegetation. Bank erosion in this reach is due primarily to streamflow.

Riparian forests surrounding the tributaries to the Sacramento River historically extended to the 100-year flood line. Today, only 5 to 15 percent of the historical extent of riparian vegetation remains, the rest were lost to agricultural conversions, stream channelization, bank and levee protection, and other factors. The remaining riparian areas are further degraded by livestock grazing and other agricultural practices, and reduced or diverted instream flows. Flood channel and levee maintenance can involve direct removal of riparian vegetation by mowing, cutting, burning, and spraying.

Butte Creek originates at an elevation of approximately 6500 feet in northeastern Butte County, and flows in a south to southwesterly direction to the Sacramento River. The upper section of Butte Creek mostly flows through a canyon before entering the Sacramento Valley southeast of Chico. The creek then flows through the upper Butte Basin and the Butte Sink before reaching the Sacramento River 5 miles downstream from Colusa.

The section of Butte Creek, located within the Phase V project boundary, flows throughout the year and supports runs of steelhead and spring- and fall-run chinook salmon. Excellent spawning and rearing habitat for salmonids is found in upper Butte Creek. Currently, 12 diversions exist on Butte Creek between the confluence of Little Butte Creek and the Sacramento River (SRA, 1989). All but one of these diversions are unscreened, resulting in mortalities of downstream migrating salmon and steelhead smolts.

The 170,000-acres Butte Basin in Butte, Sutter, Glenn and Colusa Counties serves as a natural overflow area for the Sacramento River. Approximately 19,000 acres of the Butte Sink are natural emergent and open water wetlands which provide outstanding habitat for waterfowl and other water-associated wildlife (SCS, 1979). Butte Sink is a crucial wintering area for migratory waterfowl along the Pacific Flyway.

The levees in the Phase V project area are located between Little Butte Creek and Highway 99 where they intersect. The area lies entirely within the Sacramento Valley. Several backwater areas along this section provide permanent and seasonal marsh habitat.

Cherokee Canal flows from the Western Canal to its confluence with Butte Creek in the Butte Sink. The canal drains water from Dry Creek and Cottonwood Creek, as well as the Western Canal. Spring- and fall-run chinook salmon use the canal as a migratory route. Currently, riparian vegetation consists of patches of scrub-shrub interspersed with grasslands, with few areas of riparian forest. The levees in the project area extend from Dry Creek just east of the town of Nelson downstream to the beginning of the Butte Sink.

Mud Creek originates at an elevation of approximately 3000 feet in north-central Butte County, just east of the town of Cohasset. Mud Creek flows in a southwesterly direction and meets with Big Chico Creek just before flowing into the Sacramento River. Mud Creek itself does not sustain perennial flows. A Corps of Engineers flood control project diverts flood waters into Mud Creek from Big Chico Creek. During sustained flows, juvenile spring-run salmon may use Mud Creek as nursery habitat. Riparian forest and scrub-shrub vegetation are virtually nonexistent. Livestock grazing right up to the edge of the creek is common along both Mud and Sycamore Creeks. The levees within the project boundary extend from the confluence with Sycamore Creek down to the confluence with Big Chico Creek.

Sycamore Creek, an intermittent stream, originates at an elevation of approximately 600 feet in central Butte County and flows about 4 miles before joining with Mud Creek. The project boundary extends from just north of the

confluence with South Sycamore Creek to the confluence with Mud Creek. Riparian vegetation and land use are similar to that of Mud Creek.

Deer Creek originates at an elevation of approximately 7100 feet near the northeast side of Butt Mountain, and flows 60 miles in a southwesterly direction before joining the Sacramento River, about one and one-half miles north of the town of Squaw Hill. The last 12 miles of Deer Creek lie within the Sacramento Valley. Deer Creek supports runs of steelhead and spring- and fall-run chinook salmon. The spring-run includes some of the last wild stocks in the Sacramento River System. Excellent spawning and rearing habitat exists in the upper reaches of Deer Creek. Three diversions exist on lower Deer Creek, all of them screened, which adversely affect upstream migrants (adult spring-run salmon) and downstream migrants (salmon and steelhead smolts). Water rights holders usually divert the entire summer flow (SRA, 1989).

The levees along Deer Creek in the project area extend from an elevation of 320 feet just north of Orchard Road downstream to the town of Vina. Riparian vegetation consists of grasses on wide sand/gravel bars with occasional areas of riparian forest and scrub-shrub. The river banks range from vertically cut slopes near Vina to more moderate slopes upstream.

DESCRIPTION OF PROJECT ALTERNATIVES

Background

Specifically, remedial repairs to the original flood control project proposed in Phase V could consist of levee reconstruction at various sites along the left bank of the Sacramento River from Knight's Landing Ridge Cut (River Mile 90) to Tisdale Bypass (River Mile 119), and along both banks of the Sacramento River from Tisdale Bypass north to Vina (River Mile 220). Levees could also be reconstructed along Butte Creek, Cherokee Canal, Mud Creek, Sycamore Creek and Deer Creek. The potential work sites for all the above tributaries are in Butte County except for Deer Creek, which is in Tehama County. Specific Phase V work sites are expected to be identified in the fall of 1990.

The alternative used at a particular site will depend on the geology of the site, structure of the existing levee and the extent of repairs required. Alternative designs are to correct subsidence, structural stability, or piping problems. Alternatives may be constructed waterward, landward or straddling the levee.

The four alternatives being considered are as follows:

Alternative A - Raise the levee crown and bank. This option would provide the design freeboard originally authorized by Congress for a specified flow. Specific dimensions will vary according to type of reconstruction required. According to sketches provided by the Corps, the levee crown may be raised as much as 4 feet. Construction will cover the entire slope of the levee and 13 to 15 feet beyond the existing toe of the levee.

Construction may take place on the waterside or landside of the levee, or it may straddle the levee on both sides. With either alternative, a two-to-one or three-to-one (horizontal to vertical) slope would be maintained, depending on waterside or landside construction. According to information provided by the Corps, a total width of up to 50 feet may be impacted on each side of the levee by related construction activities at a particular site.

Alternative B - Raise the levee crown and bank, plus installation of a toe drain. Same as alternative A except that toe drains would be constructed in areas where insufficient drainage of the seepage water exists. In addition to correcting freeboard, this alternative will correct piping problems.

Alternative C - Construction of a sloping drain and stabilizing berm. This alternative is designed to improve structural stability and to correct piping problems. The lower one-half bank of the levee will be strip cut to a depth of approximately 6 inches and reinforced by installing filter fabric and drainage rock from the bank down to the levee toe. The reinforcement will extend out approximately 15 feet from the toe. An embankment approximately 7 feet from the ground would be maintained and gently sloped, forming a 12-foot-wide berm. From the berm, it would be sloped at a two-and-one-half (horizontal) to one (vertical) slope to the toe of the levee.

Alternative D - Insert a soil or cement bentonite cutoff (slurry) wall within the existing levee. This alternative will improve structural stability and correct piping problems. A 3-foot-wide trench would be dug in the center of the levee crown which would extend to the foundation of the levee. This trench would then be filled with the appropriate material to minimize seepage through the levee.

BIOLOGICAL RESOURCES

Existing Conditions

Vegetation

In the study area, there are essentially six different cover types: a) wetlands/marshes; b) scrub/shrub; c) woody riparian; d) oak woodland; e) grassy; f) shaded riverine aquatic.

Historically, the constant meandering, seasonal flooding and sediment deposition by the Sacramento River created extensive natural levees, numerous sloughs, islands and marsh areas. The interface of riparian vegetation and open water created an "edge effect" which supported a greater diversity of plant and insect growth. This in turn provided habitat of greater value to fish and wildlife. Examples of such areas are seasonal marshes and streams. These areas provide valuable cover for feeding, nesting, reproduction and raising of young. Levee toe drains also provide feeding and reproductive cover for some species.

Permanent freshwater marshes may be found in several reaches of the Sacramento River and associated tributaries. They are characterized by persistent, dense strands of non-woody emergent vegetation. Common species include cattails, giant bulrush, umbrella sedge, smartweed, iceplant, California hibiscus and marsh pennywort. Marshes provide critical feeding habitat and cover to certain waterfowl, such as surface-feeding and bay ducks, and also to wading birds, such as egrets and herons.

From Knight's Landing to Colusa (River Mile 90-143), the river channel is generally constrained by levees constructed close to the river's edge. As much as 95 percent of the original riparian habitat has been lost, mainly due to agricultural conversions, stream channelization, and bank stabilization, which alters the natural flow regime and sediment transport characteristics in the river channel. The remaining riparian vegetation is often degraded and generally occurs in narrow bands along the river. Less than half the original river edge vegetation remains. Where the river is allowed to meander, wider bands of riparian habitat exist, providing valuable habitat for birds, mammals, reptiles, and amphibians. Most levees are bordered by orchards (walnut, almond, etc.), row and grain crops, rice fields, and open pastures, as well as scattered residential developments.

From Colusa to Vina (River Mile 143-220), setback levees occur up to Chico Landing; however, above Chico Landing the river is generally unleveed. The setback levees create wide berms which characterize this reach of the river. Both native riparian vegetation and agricultural areas occur on the lands between the levees. Riparian habitat occurs in parcels from a few acres to several hundred in size, and is sustained through natural processes of erosion and deposition. These substantial riparian forests support a wide diversity of wildlife.

The remaining riparian forest strips along the river contain many native and introduced tree species. The riparian canopy consists primarily of valley oak, sycamore, cottonwood and large willow. Some trees have grape or mistletoe growing on them. A well-defined woody understory typically consists of box elder, black walnut, white alder, Oregon ash and smaller cottonwood. California grape, blackberry, raspberry, mugwort, western ragweed, pigweed, clover, cocklebur, several thistles, grasses and forbs form an often dense ground cover. Non-native woody species commonly found include Eucalyptus, Acacia, giant reed and honey locust. Berms along the levee contain several varieties of grasses, forbs, weeds and woody species such as cottonwood or willow. These areas provide valuable habitat for small mammals, such as rabbits and mice, which in turn provide a food base for larger animals, such as coyotes and raptors.

Historically, riparian vegetation along the reaches of Butte Creek, Cherokee Canal, Mud Creek, Sycamore Creek and Deer Creek in the Sacramento Valley occurred in bands up to two miles wide. Currently, only 5-15 percent of the original riparian habitat remains and generally occurs as fragmented patches of scrub-shrub, forest, emergent marsh and grassland areas. Woody shrubs lining the banks typically consist of willow, smaller cottonwood, box elder, black walnut and Oregon ash. Occasional areas of shaded aquatic habitat provide escape cover and cooler stream temperatures so crucial to fish and other aquatic organisms. Herbaceous vegetation lining the tributaries is similar to that along the Sacramento River. Both native riparian vegetation and agricultural lands occur on the areas between the levees. All of the Phase V project areas along the tributaries occur along reaches in the Sacramento Valley.

Fish Resources

The Sacramento River supports an array of anadromous and resident fish species. Anadromous fishes of the Sacramento River system in the project area include chinook salmon, steelhead trout, striped bass, American shad and sturgeon. Resident warmwater fish include largemouth bass, crappie, catfish, bluegill, tule perch and sunfish.

Of greatest importance is the chinook salmon. The Sacramento River supports the largest chinook salmon population in the state. Approximately 90 percent of the Central Valley salmon population spawn in this system (Kjelson, 1982). Four genetically distinct species of chinooks presently use the river and associated tributaries: fall-, late fall-, winter-, and spring-run. According to Hallock (1987), "Total numbers of salmon that spawn in the Upper Sacramento River system have declined more than 75 percent since the 1950's. Fall-run salmon, which make up more than 90 percent of the total, appear to be stabilized at a low level of 200,000 fish; 85 percent spawn naturally and 15 percent are spawned artificially at hatcheries. However, on streams where there are hatcheries, populations are increasing, which is masking the true picture, i.e., the natural spawning populations are declining in the Upper Sacramento River system." Winter-run salmon have experienced the most precipitous decline and was listed as threatened species in 1989 by the

National Marine Fisheries Service. Counts of winter-run salmon passing the Red Bluff Diversion Dam ranged from a high of 117,080 in 1969 to a low of 400 adults in 1989 (Pacific Fishery Mgmt. Council 1990). Between the four races of salmon and the steelhead trout, some life stages of salmonids occur in the Sacramento River system at any given time.

The overall decline in numbers of steelhead and fall- and spring-run salmon occurs in the upper Sacramento River and associated tributaries. Butte Creek has experienced a 95 percent decline in the past 30 years of adult spring-run salmon, and a lesser decline of fall-run (SRA 1989). Currently, 12 water diversions exist on Butte Creek, 11 of them unscreened, resulting in the loss of downstream-migrating smolts. Deer Creek, which has also sustained a 95 percent loss of spring-run salmon in the past four decades, contains some of the last wild stocks in the Sacramento River system (SRA 1989). Wild salmon stocks are crucial to maintain the genetic diversity of the population. There are three diversion dams in lower Deer Creek, all of which are screened. Excellent spawning and rearing habitat for salmonids exists in both upper Butte Creek and upper Deer Creek. Other factors contributing to the decline of anadromous fish in these tributaries include low stream flows and high water temperatures, inadequate fish passage over diversion dams, unblocked drains that attract and strand fish, armoring of spawning gravels, and poor water quality.

Adult steelhead trout utilize the lower and middle Sacramento River as a migration corridor into the upper Sacramento River system during the fall and winter. Spawning occurs from December through April in most tributaries with year-round flows, including Butte Creek and Deer Creek. Juveniles migrate downstream primarily in the spring after two or more years of rearing in upstream areas. The current steelhead population is estimated at less than half their numbers in the 1950's (Hallock 1987).

Most of California's shad and striped bass spawn in the Sacramento River system. The American shad population has flourished in the past few years, and is estimated to be several million (FWS 1976). Striped bass populations, however, are experiencing a decline. In the 1960's, the striped bass population for the Sacramento River was estimated at 3.0 to 4.5 million; in the 1970's the population declined to 1.7 million. It has declined steadily since that time due to a multitude of water quality problems (Delta pumps, reduced Delta outflow, pollution, etc.).

White sturgeon populations are also considered unstable. Although population estimates have increased substantially since the 1970's, extreme fluctuation in numbers of fish is of concern. It is estimated that approximately 130,000 fish now reside in the Sacramento River.

Other fish species, including largemouth bass, crappie, bluegill and other sunfish, can be found in the study area. These species use river backwater areas where currents are slower and more conducive to their requirements. Most species may be found along vegetated shorelines of the river and associated tributaries where valuable cover is provided by overhanging and/or

partially submerged shrubs or trees (referred to as shaded riverine aquatic habitat). Species such as the Sacramento squawfish, hardhead and Sacramento sucker are most abundant in the larger tributaries between the 300-to 2000-foot elevation. They prefer large, deep, well-shaded, sand- or rock-bottomed pools. Fish habitat is substantially enhanced by the diversity offered by this land-water interface.

Shaded riverine aquatic habitat is found along the river where overhanging or submerged vegetation exists, usually along banks which have not been riprapped. By definition, at least 10 horizontal feet of vegetation overhangs the water surface to qualify as shaded riverine aquatic habitat. This habitat provided a dense canopy close to the water's surface such that it provides complete shade, thus a cooler shaded environment during a significant portion of each day to fish and other aquatic organisms seeking cover (Jones and Stokes 1987). Willow/alder forest most often forms the shaded riverine aquatic habitat. Cover of this type may also be provided by uneven bank edges or crevices within the bank, providing cool water habitat for fish. Higher food production may be found in these areas. Overhanging vegetation provides a detritus base for microorganisms. This productive interaction of terrestrial and aquatic environments is consequently a valuable cover type for fish.

Wildlife Resources

Wildlife occurrence in the Sacramento River system is directly related to available habitat. Agricultural development and other human modifications have resulted in a substantial loss of natural habitat. Species which were dependent of riparian, oak woodland, marsh, and grassland habitats have declined accordingly.

Portions of the project area occur within the winter range for mule deer. Other mammals present include raccoon, opossum, bobcat, river otter, mink, weasel, striped and spotted skunks, badger, red and gray foxes, Audubon cottontail, brush rabbit, blacktail hare, gray squirrel, muskrat and beaver, depending on available habitat.

The riparian zone along the Sacramento River system supports high densities of breeding birds. Common species found include the great horned owl, red-tail hawk, red-shouldered hawk, Swainson's hawk, osprey, California quail, ring-necked pheasant, mourning dove, band-tailed pigeon, mallard, wood duck, common merganser, herons, egrets, kingfishers, woodpeckers, and numerous small passerines including flycatchers, wrens, sparrows and swallows. A complete list of bird species sighted along the Sacramento River is included in the appendix.

Amphibians and reptiles which may be found along the river include the gopher snake, western fence lizard, garter snake and Pacific tree frog.

Endangered Species

At least four species which are federally-listed as threatened or endangered occur along the Sacramento River and tributaries included in the Phase V project area.

The bald eagle (Haliaeetus leucocephalus) is an endangered species which may be found near large bodies of water or free-flowing rivers. Eagles are occasionally seen using large trees and snags in riparian forests surrounding the upper Sacramento River for roosting habitat during the fall and winter. One breeding pair has a territory between Chico Landing and Red Bluff. Disturbance by construction or other human activities may cause the eagles to abandon their territories or roosting sites.

The American peregrine falcon (Falco peregrinus anatus), also an endangered species, may be found throughout the Central Valley during the winter. Peregrines prey almost exclusively on birds up to the size of ducks. One known breeding pair occurs along Deer Creek. Peregrines can be especially sensitive to any type of human disturbance.

Winter-run chinook salmon (Oncorhynchus tshawytscha) has been recently emergency listed as threatened by the National Marine Fisheries Service. Adverse impacts could also be sustained by this species if waterside construction disturbs shaded riverine aquatic habitat or increases turbidity in the river.

The valley elderberry longhorn beetle (Desmocerus californicus dimorphus) is a threatened invertebrate species which may be found in the project area. Populations are known to occur along River Miles 80-90, 126, 139, 170, 178 and 179. There are undoubtedly other areas which have extant populations of elderberry plants, the host species for the beetle. Adverse impacts to the beetle could occur if construction activities disturbed any of the plants.

The following candidate species (those species in which Federal listing is pending) may also be found in the project area:

Birds

ferruginous hawk (Buteo regalis) (winter resident)

white-faced ibis (Plegadis chihi)

tri-colored blackbird (Agelaius tricolor)

Fish

Sacramento splittail (pogonichthys macrollepidotus)

Amphibians

California tiger salamander (_Ambystoma_ _tigrinum_ _californiense_)

California red-legged frog (_Rana_ _aurora_ _draytoni_)

Reptiles

giant garter snake (_Thamnophis_ _couchi_ _gigas_)

Mammals

San Joaquin pocket mouse (_Perognathus_ _inornatus_)

San Joaquin woodrat (_Neotoma_ _fuscipes_ _riparia_)

Plants

California hibiscus (_Hibiscus_ _californicus_)

The Swainson's hawk (_Buteo_ _swainsoni_), a state-listed threatened bird, also nests along the Sacramento River from March to August.

The bank swallow (_Riparia_), also a state-listed threatened bird, has nesting colonies located in numerous areas along the upper Sacramento River. The bank swallow requires vertical banks formed by erosion along the river for nesting.

IMPACTS OF ALTERNATIVES

The following section includes a general discussion of impacts anticipated with the implementation of the individual alternatives.

Alternative A - Raise levee crown and slope

The proposed 4-foot raising of the levee would adversely affect grasses and other herbaceous vegetation growing on the existing levee slope and beyond the toe of the berm (approximately 50 feet). Depending on the location of the work (landside, waterside or straddle), the impacts would differ greatly.

Waterside construction would adversely affect shaded aquatic riverine habitat, riparian vegetation, and grasses along the levee slope. Any adverse effect on shaded aquatic riverine and riparian habitat would adversely impact anadromous fish (adults and smolts) and resident fish species. Loss of these habitat types would reduce cover and food for fish, and nutrient input to the aquatic system. Any adverse effect on anadromous fish would be significant because the Sacramento River system populations are already severely depressed.

The loss of riparian vegetation along the river would adversely affect many wildlife species. The riparian forest, with its multi-layered vegetation and high plant species density, supports the largest populations and most diverse wildlife along the Sacramento River. The high diversity of tree growth, cover

conditions and layers, and close proximity to water provide a wide variety of easily accessible habitats and niches. Any loss of plant diversity would adversely affect those species inhabiting the area.

Any loss of shaded riverine aquatic and riparian habitats would have a significant adverse impact upon songbirds and small mammals that use these areas to meet all or part of their life requisites. Cover, nesting habitat and food sources for songbirds would be lost, and cover, food and a portion of the migration corridor for small mammals would be eliminated. In addition, any reptiles and amphibians which depend on this interface of terrestrial and aquatic habitats to meet their life needs would be adversely affected.

Any disturbance and loss of riparian vegetation, and construction activity would adversely affect nesting raptors, including the Swainson's hawk. Loss or disturbance of nesting habitat could severely impact populations of these species.

The impact on grassland habitat on the levee slopes would be minimal and temporary. Disturbance or loss of this habitat would adversely impact some small mammals, raptors, and other species. However, grasses should recover to preproject conditions within two to three years after project construction and the area repopulated by similar wildlife species.

Landside construction would impact grasses on the levee slopes, trees and shrubs growing along the levee, and wetland habitats along existing toe drains. In areas where orchards are adjacent to construction sites, the loss of fruit trees would adversely impact perching birds. Also, construction activity during raptor nesting periods could lead to the failure of nesting success.

The impacts of fish, wildlife and vegetation would be significantly reduced with landside construction. It would primarily eliminate or reduce adverse project effects on riparian vegetation and shaded riverine aquatic habitat.

Straddle construction impacts could limit most of the losses to the grassy levee slopes, some riparian vegetation, and trees and shrubs found immediately adjacent to the levee toe. Also, depending on the locations of the toe drains, impacts could be reduced or eliminated to wetland habitats. The impacts to shaded riverine aquatic habitat could occur; however, they should be significantly less than those expected with the waterside construction alternative.

If a landside berm is constructed with straddle construction, the impacts would be similar to landside construction.

A significant amount of borrow material would be required to raise and reinforce the levees. The impacts on vegetation and wildlife could be adverse. However, the magnitude of the impacts would vary with site location and amount of borrow material required.

Alternative B - Raise levee crown, reconstruct levee slope, and install toe drain

The impacts of this alternative would be similar to those of Alternative A, except for the construction of toe drains. The impacts of the toe drain would vary, depending on its location, whether it is covered or not, and where seepage is directed. A covered toe drain, as proposed, would have a significantly lesser habitat value than an open toe drain. With an open toe drain, the seepage water can be used to provide a protected area for wildlife depending on how the toe drain is maintained, especially in areas presently farmed. If seepage water is allowed to flow from the toe drain into a drainage ditch, and is then directed to a nearby pond, wildlife values could be enhanced. The drainage ditch and bordering vegetation, if allowed to grow, could provide excellent cover for nesting and feeding. This type of drainage arrangement is preferred over culverting the seepage water and transporting it underground.

Alternative C - Construction of a sloping drain and stabilizing berm

This alternative would involve the removal of grasses along the lower one-half of the levee slope on the landside of the levee and the removal of any vegetation including trees and shrubs along and adjacent to the toe of the levee (50 feet from the toe). Constructed toe drains would be covered. All existing drainage ditches near the levee would be set back if impacted by construction of any alternative. The stripped section of the levee would be covered with filter cloth and compacted soil, and reseeded. The area is expected to recover in one or two years.

Habitat for small mammals, waterfowl, songbirds, raptors, amphibians, and other animal species is expected to be disturbed or degraded. The impacts can be significant if toe drains or seeps are covered and all existing drainage ditches near the levee are set back. Wildlife species inhabiting these areas would be displaced and eventually lost if these structures are not replaced. Construction of open toe drains, drainage ditches, and seeps in their new location at least 6 months in advance of remedial repair work would provide continuous wildlife habitat over time and thus help prevent loss of animals dependent upon these areas. Also, as stated earlier, raptor nesting success could be reduced if construction activity occurs during the nesting period.

Alternative D - Insert a soil or cement bentonite cutoff (slurry) wall within the existing levee

This alternative would have only minimal adverse effects on vegetation and wildlife of the area. Since construction would occur on top of the levee, little or no disturbance of wildlife habitat (aquatic habitat, riparian vegetation, toe drains, seeps,) would occur. However, construction activity could adversely affect raptor nesting success if it is conducted during the nesting periods.

Location of the staging areas and operation of heavy equipment, however, could have an adverse impact on vegetation and wildlife if they are located in sensitive areas. Also, spoil disposal could negatively impact wildlife habitat, depending on the disposal site. Disposal should be done in accordance to guidelines provided by the Service and the California Department of Fish and Game.

DISCUSSION

The Fish and Wildlife Service mitigation recommendations are based on the value of the habitat in the project area to fish and wildlife.

During impact assessment, distinct habitat types which may be impacted by the project area are identified. Evaluation species which utilize each habitat type are selected for impact analysis. Evaluation species selection is often based on a rationale including: 1) species known to be sensitive to specific land and water use actions; 2) species that perform a key role in nutrient cycling or energy flows; 3) species that utilize a common environmental resource, or 4) species that are associated with Important Resource Problems as designated by the Director of the Fish and Wildlife Service, such as anadromous fish and migratory birds. Habitat value determinations are based on the importance of the habitat found in the project area to the selected evaluation species and the relative scarcity of the habitat types.

Of all the habitat types available to wildlife, riparian habitat supports the greatest diversity and abundance of wildlife species. Unfortunately, much of the riparian habitat necessary to maintain fish and wildlife resources has been eliminated in the project area. Instream aquatic habitat in the project area is also becoming scarce. The loss of these habitat types can be attributed to numerous flood control and water storage projects, water diversions, agricultural expansion, urbanization and pollution.

The evaluation species selected to determine the value of riparian vegetation in the project area include water-associated birds, passerine birds and small and large mammals which inhabit the project area. Riparian vegetation in the project area provides important nesting, resting and feeding habitats for passerine and other birds. The riparian corridor provides a high-value feeding habitat and migration corridor to mammal species which may occur in the project area. The riparian corridor is also of high value to chinook salmon and other anadromous fish of the Sacramento River because of the importance of vegetation in providing cover, water temperature control, associated food source in the form of insect drop, and nutrient input into the ecosystem. Because of the high value of riparian habitats in the project area to fish and wildlife species, and due to the relative scarcity of these habitat types, our mitigation goal is no net loss of in-kind habitat value.

The fish evaluation species selected to determine the value of instream aquatic habitat in the project area include chinook salmon, steelhead trout, and other resident and anadromous species. The project site from River Mile 90 to 220 and Butte Creek, Cherokee Canal, Mud Creek and Deer Creek provide

principal migratory routes for anadromous fish of the Sacramento River system. In addition, Butte and Deer Creeks provide spawning and rearing habitat for steelhead and fall- and spring-run chinook salmon. Due to declining populations and loss of wild stocks, these salmonids are especially sensitive to any type of disturbance to their habitat. Therefore, the protection of instream aquatic habitat becomes extremely important in maintaining and possibly enhancing the anadromous fish resource.

Because of the high value of instream aquatic habitats in the project area to fish and wildlife evaluation species, and because of the relative scarcity of these habitat types, our mitigation goal is no loss of in-kind habitat value. Under this mitigation goal, we will seek in-kind replacement of lost habitat values.

The evaluation species selected to determine the value of permanent and seasonal wetlands, toe drains, and associated canals in the project area include migratory waterfowl and other water-associated birds, reptiles and amphibians that frequent these areas. Seasonal wetlands provide important wintering habitat for waterfowl. As the number of permanent wetlands in the Central Valley diminishes, seasonal wetlands assume an added importance for these species. Seasonal wetlands are also becoming scarce as agricultural expansion and urban growth continues.

Because of 1) the importance of permanent and seasonal wetland areas to migratory waterfowl and other water-associated birds protected under the Migratory Bird Treaty Act, and 2) the relative scarcity of this habitat in the region, our mitigation goal is no net loss of in-kind habitat value. Under this mitigation goal, we will seek in-kind replacement of lost habitat values.

The evaluation species selected to determine the value of oak woodlands and grasslands include raptors, songbirds and small mammals that inhabit these areas. Because these habitat types are still fairly common throughout the region and in the state, and because of the relatively high value to fish and wildlife, our mitigation goal for these habitats are no net loss of habitat value occur, while minimizing loss of in-kind habitat value.

To minimize the impacts of the project to fish and wildlife resources, we recommend that Alternative D be selected for further investigation or implementation to provide flood protection for the Phase V project area. This alternative would have the least damaging environmental impact of all the alternatives being investigated. Disruption of landside and waterside vegetation and wildlife habitat would be minimal. Staging areas, although impacted, would recover quickly with reseeding.

Alternative C, although less desirable than Alternative D, would have less adverse impact on biological resources than Alternatives A and B. Although disturbances of vegetation would occur on the lower one-half of the levee slope and the toe drain and nearby areas, the area is expected to recover quickly if revegetation efforts are included. Also, if an open toe drain is included as part of the project, wildlife habitat values would increase.

The impacts of Alternatives A and B would be similar except for the inclusion of a toe drain with Alternative B. From an environmental viewpoint, Alternatives A and B with straddle or landside construction would be significantly less damaging than waterside construction. Alternative A with waterside construction would be the least desirable of all the alternatives presently under investigation.

To avoid any adverse impact on valuable riparian vegetation, instream aquatic habitat, and wetlands in the project area, we recommend that alternatives that impact these habitat types not be implemented. If, however, impacts to these habitats are unavoidable, impact determinations and mitigation requirements will be accomplished through the use of the Service's Habitat Evaluation Procedures (HEP).

To mitigate adverse impacts to riparian vegetation, an area of sufficient size (as determined by HEP) should be provided for management. Plantings of indigenous riparian species (trees and shrubs) will be required in the area to gain riparian habitat values. Estimated costs to replace riparian vegetation is $25,000 per acre, excluding land acquisition and maintenance costs. Irrigation (drip system) would be required for a minimum of at least 6 years, or until the plantings are well established and self-sustaining. Any dead or decadent trees and shrubs would be replaced and maintained until well established. A detailed monitoring study would be required for a period of 20 years after the 6 year establishment period to determine the success of the plantings.

To offset the loss of instream aquatic habitat values, a planting program, coordinated with riparian plantings, would be required. Dense plantings of select indigenous trees shrubs would be required in the river and along the bank to provide overhanging cover and exposed tree and shrub roots. This, in conjunction with the placement of tree trunks and tree root balls anchored to the river bank, may be necessary.

The loss of wetland vegetation along the toe drain and seeps can be offset through the construction of new toe drains and ponding areas. To further minimize the loss, toe drain construction should be initiated, water provided, and vegetation planted (transplant from old drain), at least 6 months prior to covering old toe drains and seeps. This would essentially eliminate any adverse impact on this habitat type.

Any trees and shrubs removed along the landside toe of the levee and adjacent areas would require replacement. Mature trees and shrubs should be replaced at a ratio of at least five-to-one. All plantings will require watering and maintenance for a minimum of 6 years. The most efficient watering method is the drip system.

Any loss of grassland habitat values due to project construction can be offset by seeding the disturbed areas and newly created berms with native grasses and

forbs. Seedings could be conducted just prior to the rainy season. This would allow sufficient germination and establishment of these species.

RECOMMENDATIONS

We recommend that:

1. Based on overall impacts to fish and wildlife habitat values, Alternative D be selected for further investigation or implementation to provide flood protection to the Phase V project area. From an environmental viewpoint, we believe Alternative D would have the least adverse effect on fish and wildlife followed by Alternatives C, B and A. With regard to waterside, landside and straddle construction, we believe waterside construction would be the most detrimental of the three, followed by landside and straddle construction. Waterside construction should be avoided.

2. To mitigate any adverse impacts of the proposed alternatives on riparian vegetation, instream aquatic habitat, wetland vegetation grassland, and landside trees and shrubs, measures as indicated in the Discussion Section would be required. The impact determination and mitigation requirements will be through the use of the Service's Habitat Evaluation Procedure. Cost to conduct the procedure will be determined after selection of required remedial repairs and specific work sites.

3. To avoid construction activity impacts to Swainson's hawk and other raptors, construction not be conducted between the late March to early August period.

4. To minimize the loss of wetland vegetation (toe drains, seeps) with project construction, open toe drains be included in lieu of culverts. Toe drains should be designed to allow growth of wetland and other vegetation in and adjacent to the drain. Also, as a possible enhancement measure, depressions be excavated in adjacent farmlands and drain water be directed to these areas. This would promote the growth of wetland and other vegetation.

5. After completion of repair work, the levees and surrounding areas should be revegetated to restore wildlife habitat and overall environmental quality.

<u>Additional studies</u>

6. If waterside construction is proposed for the middle and upper Sacramento River and associated tributaries, the following procedures be implemented and the following studies be conducted:

a. Consultation with the National Marine Fisheries Service under Section 7 of the Endangered Species Act should be initiated for any

activities which may adversely affect the winter-run chinook salmon.

b. Surveys of existing winter-, spring-, fall-, and late fall-run salmon we well as other anadromous fishes should be conducted. Included in the survey should be a determination of acreage and value of aquatic habitat (shaded riverine aquatic) along the river or associated tributaries.

c. Population surveys be done for species of special concern such as the Swainson's hawk and bank swallow. The surveys would include evaluating nesting sites and territories.

We appreciate the opportunity to provide input to your planning process. For further assistance regarding this letter, please contact Cindy Levy of my staff at (916) 978-4613.

Sincerely,

Gail C. Kobetich

for Wayne S. White
Field Supervisor

cc: ARD (FWE) FWS, Portland, OR
Director, NMFS, Santa Rosa, CA
Reg. Mgr., CDFG, Region II, Rancho Cordova, CA
Reg. Mgr., CDFG, Region I, Redding, CA
Don Slebodnick, DWR, Red Bluff, CA

APPENDIX 1

BIRD SPECIES SEEN ALONG THE SACRAMENTO RIVER

The following list of bird species represents a cumulation of observations over many years. Some species may be more commonly sighted than others, depending on time of year and populations of the species.

COMMON NAME	SCIENTIFIC NAME
Common Loon	*Gavia immer*
Arctic Loon	*Gavia arctica*
Red-throated loon	*Gavia stellata*
Red-necked grebe	*Podiceps grisegena*
Horned grebe	*Podiceps auritus*
Eared grebe	*Podiceps nigricollis*
Western grebe	*Aechomophorus occidentalis*
Pied-billed grebe	*Popilymbus podiceps*
White pelican	*Pelecanus erythrorhynchos*
Double-crested cormorant	*Phalacrocorax auritus*
Great blue heron	*Ardea herodius*
Great egret	*Casmerodius albus*
Snowy egret	*Egretta thula*
Black-crowned night heron	*Nycticorax nycticorax*
Least bittern	*Ixobrychus exilis*
American bittern	*Botaurus lentiginosus*
White-fronted goose	*Anser albifrons*
Snow goose	*Chen caerulescens*
Ross goose	*Chen rossi*
Mallard	*Anas platyrhynchos*
Gadwall	*Anas strepera*
Pintail	*Anas acuta*
Green-winged teal	*Anas crecca*
Blue-winged teal	*Anas discors*
Cinnamon teal	*Anas cyanoptera*
American widgeon	*Anas americana*
Northern shoveler	*Anas clypeata*
Wood duck	*Aix sponsa*
Redhead	*Aythya americana*
Ring-necked duck	*Aythya collaris*
Canvasback	*Aythya valisineria*
Greater scaup	*Aythya marila*
Lesser scaup	*Aythya affinis*
Common goldeneye	*Bucephala clangula*
Barrow's goldeneye	*Bucephala islandioa*
Bufflehead	*Bucephala albeola*

Ruddy duck	Oxyura jamaicensis
Hooded merganser	Lophodytes cucullatus
Common merganser	Mergus merganser
Turkey vulture	Cathartes aura
White-tailed kite	Elanus leucurus
Goshawk	Accipiter gentilis
Sharp-shinned hawk	Accipter striatus
Cooper's hawk	Accipiter cooperii
Red-tailed hawk	Butoe jamaicensis
Red-shouldered hawk	Buteo lineatus
Swainson's hawk	Buteo swainsoni
Rough-legged hawk	Buteo lagopus
Ferruginous hawk	Buteo regalis
Golden eagle	Aquila chrysaetos
Bald eagle	Haliaeetus leucocephalus
Northern harrier	Circus cyaneus
Osprey	Pandion haliaetus
Prarie falcon	Falco mexicanus
Peregrine falcon	Falco peregrinus
Merlin	Falco columbarius
American kestrel	Falso sparuerius
California quail	Lophortyx californicus
Ring-necked pheasant	Phasianus colichicus
Sandhill crane	Grus canadensis
Virginia rail	Rallus limicola
Sora	Poranza carolina
Common gallinule	Callinula chloropus
American coot	Fulica americana
Semipalmated plover	Charadrius alexandrius
Killdeer	Charadrius vociferus
Mountain plover	Charadrius montanus
American golden plover	Pluvialis dominica
Black-bellied plover	Pluvialis squatorola
Common snipe	Capella gallinago
Long-billed curlew	Numenius americanus
Whimbrel	Numenius phaeopus
Spotted sandpiper	Actitis macularis
Solitary sandpiper	Tringa solitaria
Willet	Catoptrophorus semipalmatus
Greater yellowlegs	Tringa melanoleuca
Lesser yellowlegs	Tringa flavipes
Baird's sandpiper	Calidris bairdii
Least sandpiper	Calidris minutilla
Dunlin	Calidris alpina
Long-billed dowitcher	Limnodromous scolopaceus
Western sandpiper	Calidris mauri
Marbled godwit	Limosa fedoa
American avocet	Recurvirostra americana
Black-necked stilt	Himantopus mexicanus
Herring gull	Larus argentatus

California gull	Larus californicus
Mew gull	Larus canus
Bonaparte's gull	Larus philadelphia
Forster's tern	Sterna forsteri
Caspian tern	Hydroprogne caspia
Black tern	Childonias niger
Band-tailed pigeon	Columba fasciata
Rock dove	Columba livia
Mourning dove	Zenaidura macroura
Barn owl	Tyto alba
Screech owl	Otus asio
Great horned owl	Bubo virginianus
Burrowing owl	Speotyto cunicularia
Long-eared owl	Asio otus
Short-eared owl	Asio flammeus
Saw-whet owl	Aegolius acadicus
Poorwill	Phalaenoptilus nuttallii
Lesser nighthawk	Chordeiles acutipennis
Vaux's swift	Chaetura vauxi
White-throated swift	Aeronautes saxatalis
Black-chinned hummingbird	Archilochus alexandri
Anna's hummingbird	Calypte anna
Rufous hummingbird	Selasphorus rufus
Allen's hummingbird	Selasphorus sasin
Calliope hummingbird	Stellula calliope
Belted kingfisher	Megaceryle alcyon
Common flicker	Colaptes auratus
Acorn woodpecker	Melanerpes formicivorus
Lewis woodpecker	Asyndemus lewis
Yellow-bellied sapsucker	Sphyrapicus varius
Hairy woodpecker	Dendrocopos villosus
Downy woodpecker	Dendrocopus pubescens
Nuttall's woodpecker	Dendrocopus nuttalli
Western kingbird	Tyrannus verticalis
Ash-throated flycatcher	Myiarchus cinerascens
Black phoebe	Sayornis nigricans
Say's phoebe	Sayornis saya
Willow flycatcher	Empidonax traillii
Western flycatcher	Empidonax difficilis
Western wood pewee	Contopus sordidulus
Olive-sided flycatcher	Nuttallornis borealis
Vermilion flycatcher	Pyrocephalus rubinus
Horned lark	Eremophila alpestris
Violet-green swallow	Tachycineta thalassina
Tree swallow	Iridoprocne bicolor
Bank swallow	Riparia riparia
Rough-winged swallow	Stelgidopteryx ruficollis
Barn swallow	Hirundo rustica
Cliff swallow	Petrochelidon pyrrhonota
Purple martin	Progne subis

Steller's jay	*Cyanocitta stelleri*
Scrub jay	*Aphelocoma coerulescens*
Yellow-billed magpie	*Pica nuttalli*
Common raven	*Corvus corax*
Common crow	*Corvus brachyrhynchos*
Black-capped chickadee	*Parus atricapillus*
Mountain chickadee	*Parus gambeli*
Plain titmouse	*Parus inornatus*
Bushtit	*Psaltriparus minimus*
Water pipit	*Anthus spinoletta*
Cedar waxwing	*Bombycilla cedrorum*
Phainopepla	*Phainopeple nitens*
Loggerhead shrike	*Lanius ludovicianus*
Starling	*Sturnus vulgaris*
Hutton's vireo	*Vireo huttoni*
Solitary vireo	*Vireo solitarius*
Orange-crowned warbler	*Vermivora celata*
Nashville warbler	*Vermivora ruficapilla*
Yellow warbler	*Dendroica petechia*
Yellow-rumped warbler	*Dendroica coronata*
Black-throated gray warbler	*Dendroica nigriscens*
Townsend's warbler	*Dendroica townsendi*
Black-throated blue warbler	*Dendroica caerulescens*
Black-throated green warbler	*Denroica virens*
Hermit warbler	*Dendroica occidentalis*
MacGillivray's warbler	*Oporonis tolmiei*
Common yellowthroat	*Geothlypis trichas*
Yellow-breasted chat	*Icteria virens*
Wilson's warbler	*Wilsonia pusilla*
House sparrow	*Passer domesticus*
Western meadowlark	*Sturnella neglecta*
Yellow-headed blackbird	*X. xanthocephalus*
Red-winged blackbird	*Agelaius phoeniceus*
Tri-colored blackbird	*Agelaius tricolor*
Hooded oriole	*Icterus cucullatus*
Brewer's blackbird	*Euphagus cyanocephalus*
Brown-headed cowbird	*Molothrus ater*
Western tanager	*Piranga lucoviciana*
Black-headed grosbeak	*Pheucticus melanocephalus*
Blue grosbeak	*Guiraca caerulea*
Lazuli bunting	*Passerina amoena*
Purple finch	*Carpodacus purpureus*
House finch	*Carpodacus mexicanus*
Pine siskin	*Spinus pinus*
American goldfinch	*Spinus tristis*
Lesser goldfinch	*Spinus psaltria*
Lawrence's goldfinch	*Spinus lawrencei*
Rufous-sided towhee	*Pipilo erythrophthalmus*
Brown towhee	*Pipilo fuscus*
Sayannah sparrow	*Passerculus sandwichensis*

Vesper sparrow	Pooecetes gramineus
Lark sparrow	Chondestes grammacus
Rufous-crowned sparrow	Aimophila ruficeps
Sage sparrow	Amphispiza belli
Dark-eyed junco	Junco hyemalis
Chipping sparrow	Spizella passerina
White-crowned sparrow	Zonotrichia leucophrys
Golden-crowned sparrow	Zonotrichia atricapilla
White-throated sparrow	Zonotrichia albicollis
Fox sparrow	Passerella iliaca
Lincoln's sparrow	Melospiza lincolnii
Song sparrow	Melospiza melodia

Source: USFWS, 1976

Reg. Mgr., CDFG, Region II, Rancho Cordova, CA

Reg. Mgr., CDFG, Region I, Redding, CA

Jim Slebotnick, DWR, Red Bluff

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APPENDIX E

SACRAMENTO RIVER FLOOD CONTROL SYSTEM EVALUATION,

PHASES II-V

Comments and Responses

TABLE OF CONTENTS

BUTTE COUNTY MOSQUITO ABATEMENT DISTRICT

DISTRICT OFFICE AT
N.E. CORNER OF OROVILLE AIRPORT
ON LARKIN ROAD
PHONE (916) 533-6038
342-7350
FAX (916) 534-9916

5117 LARKIN ROAD
OROVILLE, CALIFORNIA 95965

WILLAIM E. HAZELTINE, PH.D.
MANAGER - ENVIRONMENTALIST

December 3, 1991

U.S. Army Corps of Engineers
1325 J Street
Sacramento, CA 95814-2922

Attn.: CESPK-PD-R

Subject: Draft EIS, Sacramento River Flood Control System Phases II - V. October, 1991

Sir:

Thank you for sending your Draft EIS/EIR for the captioned project.

1. We were pleased to read Section 4.11 on page 14 in which you recognize the need for mosquito control considerations. We were particularly encouraged to have your assurance that mitigation plans for local specific projects would be coordinated with local abatement agencies, to reduce the risks of mosquito production, where possible. This is the first EIS I am aware of which recognizes the requirement of 40 CFR Section 1506.2(d), and then complies.

We will look forward to working with you when you have projects within our jurisdiction.

Sincerely,

W E Hazeltine

William E. Hazeltine, Ph.D.,R.P.E.
Manager - Environmentalist

WEH/km
Enclosure: Wetlands and Disease paper

cc: Sacramento Co.-Yolo Co. MAD
Sutter-Yuba MAD
Colusa MAD
Tehama Co. MAD

BUTTE COUNTY MOSQUITO ABATEMENT DISTRICT

RESPONSE TO COMMENT 1: Comment noted.

California Central Valley Flood Control Association

JAN 15 1991

Colonel Lawrence R. Sadoff
District Engineer, Sacramento District
U. S. Army Corps of Engineers
1325 J Street
Sacramento, California 95814

Re: Sacramento River Flood Control System Evaluation, Phases II-IV; Review of Draft Programmatic Environmental Impact Statement/Environmental Impact Report

Dear Colonel Sadoff:

The California Central Valley Flood Control Association (CCVFCA) is organized to collectively represent the vital interests and concerns of its membership, primarily consisting of those who operate and maintain the flood control projects in the Sacramento and San Joaquin Valleys and those entities directly impacted by the flood control projects. Many of our members are Reclamation Districts and Counties which have direct responsibility for the operation and maintenance of the Sacramento River Flood Control Project. Due to the great importance of this project to our membership, we appreciate the opportunity to review the Draft Programmatic EIS/EIR for the Sacramento River Flood Control System Evaluation Phases II-IV.

1. The CCVFCA fully supports all phases of the Sacramento River Flood Control System Evaluation, which will provide much needed remedial repairs to the Sacramento River Flood Control Project. Even though the Project performed admirably during the record floods of 1986 by preventing mass devastation and great loss of life, significant project deficiencies in the Federally constructed project are apparent and should be corrected. Project deficiencies such as unstable levee slopes, excessive seepage through levees, dangerous boils, and levees which are below design grade have become apparent during the 1986 and previous flood events.

3 • Elks • Building
921 • 11th • Street
Sacramento • CA • 95814
Phone (916) 446-0197
Fax (916) 446-2[illegible]

2. Overall, we believe the Draft EIS/EIR to be a well-written document which adequately meets the requirements of the National Environmental Policy Act and the California Environmental Quality Act for a Programmatic Document. However, we offer the following comments which we think will improve the accuracy of the final EIS/EIR document.

3. In general, the no-action alternative analysis severely underestimates the environmental impacts which would certainly occur if remedial action is not undertaken to correct levee deficiencies. Although some impacts are mentioned occasionally in the document, they are not used consistently and are underestimated. Massive environmental damage would result from levee failures which is the likely result of the no-action alternative. Once flooded, most areas would remain submerged for a long period of time, particularly if the levee failure occurred on a Delta Island. Virtually all habitat types and the associated species using the habitat would be adversely affected by levee failures. The EIS/EIR should reassess the environmental impacts of the no-action alternative, and the discussion of these impacts should be consistent throughout the document. The reanalysis should also address the impacts which will result from reconstruction of levees resulting from levee failures due to the no-action alternative. Specifically, the Final EIS/EIR should reassess the no-action environmental impacts at the following locations: Page DEIS 18 (Section 5.1.2); page DEIS 20 (Section 5.2.2); DEIS 26 (Section 5.4.2). Other specific comments are presented in the following paragraphs.

4. Page DEIS 12 (Section 4.7) discusses Water Quality. The section should be revised to acknowledge that a levee failure in the Delta could have severe impacts on water quality, particularly due to an influx of saline waters. This impact could have major negative effects on fish and wildlife resources, the State Water Project, the Central Valley Project, municipal water supplies such as the Contra Costa County water intake, and the millions of people relying on the Delta for water supply, as well as agricultural users.

5. Page DEIS 14 (Section 4.10) should not ignore the positive socioeconomic impacts which would result from an increase in construction employment deriving from remedial repairs to the Sacramento River Flood Control Project. This positive impact is especially important in "sparsely populated" areas severely impacted by the current recession.

6. Page DEIS 17 (Section 5.1.1) which discusses shaded riverine aquatic habitat neeeds to be clarified. The "definition" which discusses the 10-foot overhang needs to define at what water level the overhang is measured. Variations in water levels due to flow variations, and in tidal areas, due to tides and flow variations should be addressed. A more definitive definition needs to be presented.

Thank you again for the opportunity to review the draft document. We wish to reemphasize our support for the Sacramento River Flood Control System Evaluation and recognize the efforts of the Corps and Reclamation Board in completing the draft Programmatic EIS/EIR. We see this as an important step in securing much-needed remedial repairs to the deficiencies present in the Sacramento River Flood Control System. We look forward to continued cooperation with your staff as the project progresses toward construction.

Sincerely yours,

B. E. Martin

B. E. Martin
Manager

CALIFORNIA CENTRAL VALLEY FLOOD CONTROL ASSOCIATION

RESPONSE TO COMMENT 1: Although the Corps of Engineers regularly inspects the levee embankments and coordinates with local entities responsible for the maintenance of levees to determine if problem areas exist, it is important that anyone who observes a potential problem area report their concerns to The Reclamation Board (State of California) or the Corps of Engineers.

RESPONSE TO COMMENT 2: Comment noted.

RESPONSE TO COMMENT 3: The text has been revised to include the potential adverse impacts on wildlife habitat and associated species, fishery resources and Rare, Threatened and Endangered species resulting from levee failure and the subsequent need for major levee reconstruction. Text revisions are found in Sections 3.0, 5.1.2, 5.2.2, 5.3.2, and 5.4.2.

RESPONSE TO COMMENT 4: Section 4.7 Water Quality has been revised to discuss potential adverse impacts on water quality associated with the No Action alternative. Adverse impacts would include those due to levee breaks and the need for extensive levee reconstruction due to levee failure.

RESPONSE TO COMMENT 5: Section 4.10 Socioeconomics has been revised to include the increase in employment of project construction workers. The construction workforce would primarily be from the regional area. Beneficial effects would be on a regional basis and only incidentally affect the "sparsely populated areas."

RESPONSE TO COMMENT 6: Section 5.1.1 Vegetation - Existing Conditions has been revised to clarify the definition of shaded riverine aquatic habitat.

Jan 17, 1992

THE CALIFORNIA NATIVE PLANT SOCIETY

To: U S Army Corps of Engineers
Sacramento District,
Attn: CESPK-PD-R
1325 J Street
Sacramento Ca. 95814-2922

From: Patrick E Kelly
Conservation Chair Mount Lassen Chapter
900 East 19th St
Chico 95928 Ca,

Subject: Draft Programatic Environmental Impact Statement- Sacramento River Flood Control System Evaluation, Phases II-V

Gentlemen

1 The Draft E I S on page 16, Section 5.1, Vegetation, states that

there are six plant communities found along the Sacramento River. These are given as valley grassland, agricultural, riparian grassland, shrub scrub, riparian and marshland. We do not feel that these terms adequately describe the riparian plant communities there. It is our understanding that the standard list of names and descriptions of California plant communities are contained in the following publication "Preliminary Description of the Terrestrial Natural Communities of California" by Robert F. Holland, State of California, The Resources

agency, Department of Fish and Game, Nongame Heritage Program.

We ask that these standardized terms and descriptions be used due because, due to thier increasing rarity, the plant communities found in the Sacramento River flood plain need special protectio. Some exangples could be, Elderberry Savanna, Coastal and Valley Freshwat Marsh and Great Valley Valley Oak Forest

2. In response to public concern over the degradation of the Sacramen riparian ecosystem there are several programs underway to

preserve and restore this ecosystem.
These are;

1. The North Central Valley Wildlife Management area by the U.S Fish and Wildlife Service.

2. The program for fishery and riparian habitat restoration proposed by the upper Sacramento River Advisory Council. This council was established by California Senate Bill 1086 and included representatives of the Corps of Engineers

3. The acquisition of lands along the river by the California

Deparment of Fish and Game Wildlife Conservation Board.

4. The restoration of riparian habitat in progress by The Nature Conservancy at Kopta Slough and at the mouth of Stony Creek.

There is no reference to these programs in the Draft E.I.S. Will the proposed level repair have an impacts on these programs? We believe this question should be addressed.

Respectfully submitted
Patrick E Kelly
Conservation Chair
Mount Lassen Chapter

THE CALIFORNIA NATIVE PLANT SOCIETY

RESPONSE TO COMMENT 1: The information relative to the various plant communities was furnished to the Corps of Engineers (CE) by FWS. For the purposes of the PEIS, which is intended to be general in scope, the CE feels that this level of definition is satisfactory.

RESPONSE TO COMMENT 2: Future phases of the project will be designed to be compatible with or enhance the programs that were mentioned. CE will make every attempt to incorporate mitigation efforts with these other programs wherever possible.

The following information on additional CE environmental projects underway on the Sacramento River system been added to Section 10.3 Ongoing Projects:

Section 10.4.9 Upper Sacramento River Habitat Restoration has been added to the text.

Section 10.4.10 SB 1086 has been added to the text.

DEPARTMENT OF
PLANNING AND DEVELOPMENT

CITY OF SACRAMENTO
CALIFORNIA

1231 I STREET
SACRAMENTO, CA

ADMINISTRATION
ROOM 300
95814-2987
916-449-5571

ECONOMIC DEVELOPMENT
ROOM 300
95814-2987
916-449-1223

ENVIRONMENTAL SERVICES
ROOM 301
95814-3982
PH 916-449-2037
FAX 916-449-1221

January 20, 1992

District Engineer
U.S. Army Engineer District
650 Capitol Mall
Sacramento, CA 95814-4794

Subject: **Draft Programmatic Environmental Impact Statement/Draft Environmental Impact Report: Sacramento River Flood Control System Evaluation, Phases II-V**

District Engineer,

1. The City of Sacramento appreciates this opportunity to review the above referenced document. The City does not have any comments regarding the above referenced project.

Sincerely,

Joseph Broadhead

Joseph Broadhead
Associate Planner

cc: ECC Members
Project File EC91-055

CITY OF SACRAMENTO

RESPONSE TO COMMENT 1: Comment noted.

WALTER COOK
Attorney at Law

215 Country Club Road
Marysville, CA 95901
(916) 743-3272

January 21, 1992

U.S. ARMY CORPS OF ENGINEERS
Sacramento District
ATTN: CESPK-PD-R
1325 Jay Street
Sacramento, CA 95814-2922

Subject: Sac. River Flood Control System
Evaluation, Phases II-V, Prog. EIS/EIR

MY COMMENTS FOLLOW:

1.-7. 1. COMMENT PERIOD: [The time for public comment should be extended.] [Whatever notice there was did not adequately get passed down to the general public. There should have been more of an effort to provide publicity.] [It also was not sufficient to make the document available for public view only in Sacramento, Courtland and Chico. There are many citizens who will be affected by the project in the Marysville/Yuba City/Colusa and other populated areas who would find it difficult to travel many miles to review the document, especially when coupled with the inadequate notice.] [The hearings to consider the project were also held too close in time to the January 21, 1992 deadline for comments. Rather than a few days before the deadline, the hearings should have been held in the beginning thereby helping with publicity and giving the public more time to adequately consider the EIS-EIR.] [At the January 13, 1992 hearing in Yuba City, there were insufficient copies of the document available for the people in attendance. I was procided with the last available copy at a time when there were still other people coming into the hall.] [Even with the cocument, this only allowed my 8 days to consider this lengthy and important document. Anyone not not receiving the document would have precious little time to do anything.] [The time for public comment should be extended at least another 30 days with a sincere effort to provide as extensive publicity as possible.]

8. 2. GROWTH INDUCING IMPACTS: The document is deficient in failing to adequately address the growth inducing aspects of the proposed project. It merely states on page 34 that:

> "The proposed reconstruction work would ensure that the existing levee system meets the Congressionally-authorized design conditions. The work would not enhance the original design levels. Therefore, the work is not expected to impact existing growth trends in the flood plain and adjacent areas."

If the present levee system met the original design levels there would be no need for the proposed project. In fact existing conditions will be materially altered. The proposed project will justify development in vast areas along the river system

which are not now possible based on the existing flood control system. The document should be altered to consider the growth inducement of the actual changes which will occur as a result of the project

9. 3. ALTERNATIVES: Except for "No Action" the alternatives discussed in Section 3.0 only consider modification of levees in place. The document should also consider the economic, environmental and other impacts of new levee locations set further back from the river. By moving the levees to higher ground in some locations, they would not need to be as strong or as high. In addition to less cost, this could lead to more wetland, open space and other habitat, cleaner water and other significant benefits. The document should be amended to consider this additional alternative.

10. The alternative of permitting a wide meander belt should also be considered on its own. This would include the benefits mentioned above including protection for the Bank Swallows, Chinook Salmon, and other species, endangered, threatened and otherwise. Such an alternative would also constitute mitigation for some of the unavoidable impacts of the project.

11. The No Project Alternative does not adequately address the economic, environmental and other impacts which will continue for generations to come without the project. The document fails to cover this alternative in any detail and should be amended to do so.

12. 4.PUBLIC ACCESS: The document fails to give consideration to the fact that the levee system will be paid for by public funds and that the public should not be excluded from the direct benefits of the project. For example, the public should be permitted to walk on the levees and on any easements they have paid for. The attitudes of the adjoining landowners (who will greatly benefit from the project) may be considered, but not to the exclusion of the public. The document should not lose sight of the fact that the levees belong to the public and the public needs, rather than the narrow private interests, must control. The document should also consider all aspects of public access, including the benefits of trails along both banks of the rivers for their entire length.

13. 5. MITIGATION: Any plants, trees, shrubs or other plant life which are to be destroyed by the project should be replaced. For example, the document refers to the possible loss of raptor perching trees resulting from the levee work. If this is the case, new trees should be planted.

Yours truly

Walter Cook

WALTER COOK

WALTER COOK

RESPONSE TO COMMENT 1: The Notice of Availability of the DEIS/EIR was published in the Federal Register on November 25, 1991. The comment period was 56 days which is greater than the 45 day review period provided for under the Federal and State statutes. The environmental documents which will be prepared for specific work sites will be circulated for public review and comment.

RESPONSE TO COMMENT 2: The public involvement process began over a year prior to release of the DEIS/EIR. The public comment period was initiated with the publication of the Notice of Intent (NOI) in the February 1, 1990 Federal Register. A number of environmental issues were identified in response to the NOI. Four scoping meetings were held to solicit information from the public on what to include in the draft document. After completion of the DEIS, over 1,000 Notices of Availability were mailed to persons and organizations who had expressed an interest in the project to solicit their comments. In addition, over 100 press releases were mailed to television and radio stations and newspapers informing them of the dates and times of workshops and public hearings.

RESPONSE TO COMMENT 3: Copies of the draft for public review were available at the COE, the State Resources Agency, and Oroville. Also, over 300 copies of the draft were mailed to agencies and individuals who had requested this information. In the future additional library locations will be used for placement of the documents and public review as stated in Response 2, Nadine Ohliger.

RESPONSE TO COMMENT 4: The timing of the public workshops and hearings was difficult in that a decision had to be made as to whether to schedule right before or during the Christmas holiday season or after. It was decided that more public participation would result if the meetings were held in January.

RESPONSE TO COMMENT 5: It was our intention to have an adequate number of copies of the DEIS available at the public hearing. We appreciate your bringing the shortage to our attention; we will have a larger number available in the future. All those attending did have an opportunity to request copies of the DEIS and be placed on future mailing lists by so indicating on their sign up cards.

RESPONSE TO COMMENT 6: Please refer to the Responses to Comments 2 and 4.

RESPONSE TO COMMENT 7: Please refer to the Responses to Comments 1 and 2.

RESPONSE TO COMMENT 8: The proposed project will not increase flood protection levels over that originally authorized. The approved and proposed development within the areas affected by the

project is based upon the assumption that the authorized level of protection is provided. Therefore, by providing the level of protection originally intended, the project is not expected to induce land use changes. It will allow implementation of current land use plans which were based on the design levels of protection.

RESPONSE TO COMMENT 9: Under the current investigation, the Corps of Engineers has no authority to modify the extent, scope or purpose of the authorized Sacramento River Flood Control Project. This authorization not only precludes the construction of new levees but also the acquisition of lands that would be needed for the construction of new facilities.

RESPONSE TO COMMENT 10: Under the Sacramento River Flood control System Evaluation, the Corps has no authority to modify the extent, scope or purpose of the existing Sacramento River Flood Control Project and this authority would preclude evaluation of a meanderbelt plan. However, the Corps can acquire lands to mitigate for adverse impacts associated with the project.

A meander belt alternative can be considered but it would require a new Congressional study authorization different from our existing investigation. Normally this would require a local entity requesting a study of this type and a willingness to cost share in future studies and potential implementation.

RESPONSE TO COMMENT 11: The text has been revised. Please refer to the Response to Comment 5, Ohliger.

RESPONSE TO COMMENT 12: Any levee repairs associated with the System Evaluation will be conducted by the Corps of Engineers with the State Reclamation Board acting as local sponsor. The State, as the nonfederal local sponsor has the responsibility of providing all lands, easements, rights of way and relocations associated with the levee reconstruction contracts.

Cities, counties, reclamation districts, levee maintenance districts or other entities who cost share in the project with the State may assist them in providing the rights of way associated with the project. Where the State or other public entities have an established easement for levee maintenance, that easement is temporarily passed on to the Corps of Engineers for the duration of the project through joint use agreements. If there are existing bike trails on the levee under Reclamation Board permit, these trails are replaced as part of the project. If no trail exists, the State or entity easement may not have sufficient rights to allow construction of a bike trail. If a non-State entity desires the addition of a bike trail or pedestrian access as part of the project, they will be responsible for providing the right of way and any costs associated with the design and construction of the facility.

The Reclamation Board requires a permit for all bike trails and

requires that they have a minimum width of twelve feet with one foot shoulders. As long as the entity requesting a permit can demonstrate sufficient property rights for its construction, and its construction and maintenance is in conformance with Board standards, the Board generally supports their construction.

The issue of public access is also tied to the type of easement held by the Board or entity. If the property is held in fee ownership by the State, public access is generally provided. If ownership is held by a non-State entity, the State considers this a local issue. If an easement is the only property right being held, it is generally very difficult and costly to modify this easement to include activities other than public safety, levee maintenance and flood lighting.

RESPONSE TO COMMENT 13: Mitigation for loss of habitat is a project requirement. Please refer to Response to Comment 8, Nadine Ohliger for a description of the evaluation process.

COUNTY OF SACRAMENTO
DEPARTMENT OF PARKS AND RECREATION

January 6, 1992

US Army Corps of Engineers
Sacramento District
ATTN: CESPK-PD-R
1325 J Street
Sacramento, CA 95814-2922

RE: Draft EIS/EIR - Sacramento River Flood Control System Evaluation, Phases II-V

Dear Sirs:

As requested, we offer the following comments on the above referenced project.

1. Recreation

A.1. Identification of other potential recreation facilities should include bicycle and equestrian trails, overlooks, nature study areas (pedestrian), courtesy docks and picnicking.

B.2. When more detail is available, Sacramento County would need to know what existing recreational facilities will be affected, how and when.

2. Ongoing Projects

A.3. Sacramento River Greenway and Dry Creek Parkway are ongoing projects that will be affected in the flood control project.

B.4. Is there opportunity to create a vegetative enhancement corridor with a bicycle trail along the R/W in the project limits? See above.

3711 Branch Center Road • Sacramento, California 95827 • (916) 366-2061

3. Levee Work

A. 5. What is extent of new levees or levee repair work on Sacramento River between Sacramento - Sutter County line and Freeport?

B. 6. How is flooding affected along Dry Creek with levee work?

4 7. Drainage improvements at or near the landward toe of the levee could provide an elevated bicycle trail/service road and vegetative enhancement corridor.

5. 8. Sacramento County has also indicated interest in participating as a non-federal sponsor under the Federal Water Project Recreation Act of 1965. This is not indicated in the report (DEIS pg. 30).

9. We favor the drainage improvements at or near the landward toe of the levee embankment alternative along the Sacramento River. It seems to have the least amount of adverse impacts (next to no action) and provides some opportunities to implement trails along the levee.

We appreciate the opportunity to review and comment on your draft EIS/EIR. Please keep us informed. Should you have questions, contact me at 366-2057.

Sincerely,

Tara Gee

Tara Gee
Landscape Planner

TG:bs:010692

cc: Roy Imai

COUNTY OF SACRAMENTO
DEPARTMENT OF PARKS AND RECREATION

RESPONSE TO COMMENT 1: Section 5.6.2 Impacts (on Recreation) has been revised to include the other potential recreation facilities suggested.

RESPONSE TO COMMENT 2: Future environmental documentation for specific work sites will include identification of any recreation facilities impacted. This information will be provided to your department to determine the level of impacts and suggested mitigation measures.

RESPONSE TO COMMENT 3: Under the Sacramento River Flood Control System Evaluation, no reconstruction work was recommended for the existing project levee on Dry Creek. (The project levee is that levee which was authorized and constructed as part of the Sacramento River Flood Control Project). Reconstruction work that may be needed on the Sacramento River within the County of Sacramento has not been finalized by the Corps of Engineers. When site specific information is known, coordination will be initiated with concerned agencies to avoid or minimize adverse impacts to ongoing projects.

RESPONSE TO COMMENT 4: Yes. New recreational facilities could be constructed as part of the reconstruction work provided a non-Federal sponsor participates in the design and construction of recreation facilities (50% of the cost) and assumes operation and maintenance responsibilities (100% of the cost). Specific details of a recreation plan will not be available in the final EIS/EIR, but would be included in the EA's for the individual phases of the project. See additional discussion in Response to Comment 8.

RESPONSE TO COMMENT 5: To date the Corps of Engineers has not finalized the reconstruction work that might be needed to repair existing project levees along the Sacramento River between the Sacramento-Sutter County line and Freeport. Under the present investigation (Sacramento River Flood Control System Evaluation), the Corps can only propose reconstruction work necessary to correct design and construction deficiencies inherent in the existing levees and other facilities of the authorized Sacramento River Flood Control Project. The Corps has no authority in this study to evaluate the construction of new levees.

RESPONSE TO COMMENT 6: As stated above, no reconstruction work was recommended on Dry Creek.

RESPONSE TO COMMENT 7: Yes. A bicycle trail and vegetative enhancement corridor could be provided if a non-Federal sponsor assumes responsibility. Please refer to Response to Comments 4 and 8.

RESPONSE TO COMMENT 8: Section 5.6.2 Impacts (on recreation) has been revised to include Sacramento County as a possible non-Federal sponsor. To become a sponsor Sacramento County would need to furnish a letter to the Corps offering to provide the requirements of local sponsorship. The State Reclamation Board would also need to furnish a letter stating they concur and support Sacramento County in this effort. Sacramento County representatives would then take an active role in the design and location of facilities.

RESPONSE TO COMMENT 9: Toe drains at or near the landside toe of the existing levee embankment are generally the most economical method in undeveloped areas. If the toe drains are effective in minimizing seepage problems, they will probably be the most cost effective method and would probably be recommended over other methods.

If a stability berm is required in conjunction with a toe drain or other drainage improvements to minimize the potential of levee embankment slope failures, the drain and berm would be constructed at the landward toe of the levee. This stability berm would appear to provide more opportunity for recreation trails and would probably be one of the reconstruction methods recommended for undeveloped areas.

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Centers for Disease Control
Atlanta GA 30333
January 15, 1992

U.S. Army Corps of Engineers
Sacramento District
ATTN: CESPK-PD-R
1325 J Street
Sacramento, California 95814-2922

Dear Sir:

We have completed our review of the Draft Programmatic Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Sacramento River Flood Control System Evaluation, Phases II-V. We are responding on behalf of the U.S. Public Health Service.

1. We have reviewed the DEIS for potential adverse impacts on human health, and we believe related issues have been adequately addressed. We were pleased to note that any proposed mitigation plans would be coordinated with the local mosquito abatement district to ensure that local mosquito populations would not be increased as a result of reconstruction work.

2. We noted that a review of literature indicated that numerous hazardous and toxic wastes (HTW) sites exist in the study area, but are "probably not located in any areas where reconstruction work would be proposed." We agree that field reconnaissance and review of aerial photos of specific work sites will be necessary during each future phase of the project to determine if there are any listed or unlisted HTW sites in the project right-of-way which would need mitigation. We were pleased to note that a contingency plan would be developed for a course of action in the event that HTW sites are uncovered during construction.

Thank you for the opportunity to review and comment on this draft document. Please insure that we are included on your mailing list to receive a copy of the Final EIS, and future DEIS's which may indicate potential public health impacts and are developed under the National Environmental Policy Act (NEPA).

Sincerely yours,

Kenneth W. Holt

Kenneth W. Holt, M.S.E.H.
Special Programs Group (F29)
National Center for Environmental
Health and Injury Control

DEPARTMENT OF HEALTH & HUMAN SERVICES

RESPONSE TO COMMENT 1: Comment noted.

RESPONSE TO COMMENT 2: Comment noted.

STATE OF CALIFORNIA — BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

DEPARTMENT OF TRANSPORTATION
DISTRICT 3, SACRAMENTO
P. O. BOX 942874-MS 41
SACRAMENTO, CA 94274-0001
TDD (916) 741-4509
Telephone (916) 324-6642

January 9, 1992

CSAC246
03-SAC-Var.
Sac. River Fld. Cntrl.
Systm. Eval. Phs. II-V
DEIR/DEIS
SCH:#90020051

Col. Lawrence Sadoff
United States Army Corps of Engineers
Sacramento District
1325 J Street
Sacramento, CA 95814-2922

Dear Col. Sadoff:

Thank you for the opportunity to review and comment on the above referenced document.

COMMENT:

Restoration should cause no significant impacts. Work performed in the State right of
1. way will require an encroachment permit from Caltrans. Major conclusions state "to restore
2. (but not increase) the design conditions." Caltrans considers raising the levee an increase.

If you have any questions regarding this comment, please contact Sharon Scherzinger at 916-324-6642.

Sincerely,

Robert M. O'Loughlin
Chief, Planning Branch C

DEPARTMENT OF TRANSPORTATION

RESPONSE TO COMMENT 1: An encroachment permit will be acquired for any work performed in the State right-of-way.

RESPONSE TO COMMENT 2: Raising levees in selected areas is an alternative under consideration. However, levee raising associated with the project would only raise project levees in areas where the levee crown is less than the original levee crown design profile. Raising the levees to the original design profile only restores the levee height to its authorized elevation and does not provide any increase in the level of flood protection originally authorized and approved by Congress for the project levees.

Dec 2, 1991
Los Molinos Ca.

U.S Army Corps of Engineers
1325 J. Street
Sacto. CA.

Sirs:

In response to your letter of Nov 25, & being unable to attend your hearing, we
1. wish to inform you of our need for bank protection on our property.

The fact that we have had several dry years have given us some protection, but as soon as any flooding returns we will find our home possibly in jeopardy-

When we purchased this property in 1973 our property was seperated from the river with a slough & 2½ acre island. During the ensuing years, with upstream changes & floods, the area has completely eroded & now our property is being under-mined-

Will you please consider a study of this area & hopefully find a solution.

Sincerely yours
Mrs Samuel H. Hoff Sr

MRS. SAMUEL H. FOX SR.

RESPONSE TO COMMENT 1: Under the current investigation, Sacramento River Flood Control System Evaluation, the Corps of Engineers has no authority to evaluate or to propose remedial measures to correct for bank erosion. You should address your concerns to The Reclamation Board (State of California), since The Board was the local sponsor for bank protection work on the Sacramento River between Chico Landing and Red Bluff.

U.S. Army Corps of Engineers
The Reclamation Board, State of California

Notice of Availability
Draft EIS/EIR
Sacramento River Flood Control System Evaluation, Phases II–V

NOVEMBER 25, 1991

The Draft Programmatic Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Sacramento River Flood Control System Evaluation, Phases II-V is available for public review and comment. The study was accomplished jointly by the Corps of Engineers and the State of California through the Reclamation Board as lead agencies under the National Environmental Policy Act and the California Environmental Quality Act, respectively.

The draft EIS/EIR describes the investigation of alternative methods of levee reconstruction for flood control in the study area which includes the Sacramento River and tributaries from Red Bluff to Collinsville, divided into five phases. Alternatives include drainage improvements, raising levees, cutoff walls and stabilizing berms.

The draft EIS/EIR is available for public inspection at the following locations: (1) The U.S. Army Corps of Engineers Library, 1325 J Street, Sacramento, California; and (2) The Resources Agency Library, 1416 9th Street, Sacramento, California.

The Corps of Engineers requests your comments on the draft Feasibility Report and EIS/EIR during the 45-day public review period which extends to January 21, 1992. Address your written comments to: U.S. Army Corps of Engineers, Sacramento District, ATTN: CESPK-PD-R, 1325 J Street, Sacramento, CA 95814-2922. Public hearings to accept verbal comments from the public will be held at 6:30 P.M. on the following dates and at these locations: (1) January 13, 1992 at the Yuba City Veterans Hall, 1330 Butte House Road, Yuba City, California; (2) January 14, 1992 at the Resources Agency Auditorium, 1416 Ninth Street, Sacramento, California; and (3) January 16, 1992 at the Bates Elementary School, 180 Primasing Avenue, Courtland, California. A notice of the meeting dates and times will be advertised prior to the first meeting. For additional information regarding this project or the public meetings, call Mr. David Gundlach, Project Manager, Corps of Engineers, at (916) 557-6675 or Mr. Ricardo Pineda, State of California, Reclamation Board, at (916) 653-6029.

Nov 27, 1991

1. We reiterate our earlier comments. Channelling and bank degradation is too injurious to the native riparian atmosphere. The estuaries are minor, but important to my land as well, & we feel there must be other more environmentally sound ways, fencing, not so radical though – to protect the rivers' species.

Mr. & Mrs. Edwin N. Graves 201 Shasta Ave. Mt Shasta, CA 96067

MR. AND MRS. EDWIN N. GRAVES

RESPONSE TO COMMENT 1; Project impacts on esthetic resources and loss of riparian values are areas of concern to the Corps of Engineers. Section 4.12, Eshthetics has been added to include a discussion on esthetic values in the project area and impacts on them. The intent of the environmental analysis is to develop the least environmentally damaging alternatives and subsequently select the most effective mitigation measures. The project alternatives do not include bank channelization. Also, the alternatives consist primarily of work on the landward side on the levee which will avoid most in-channel impacts.

Heringer Ranch Division - ORIC

Yolo, Sacramento & Solano Ranches

January 23, 1992

U.S. Army Engineer Corps
1625 J Street
Sacramento, CA 95814-2922

Dear Sirs:

1. I am writing to express my serious concern regarding the priority ranking system and cost allocation which is being considered in the repair of the Sacramento River Levee System. It is my understanding of the Draft EIR on Phases II, III, and IV, that the determination for priority work will be based on a cost/benefit analysis completed by area or region and will not consider the impacts to the overall system. This will obviously leave those of us in lower density agricultural areas at an extreme disadvantage. If we are left to deal financially with long sections of the Sacramento River Levee on an individual or district basis the economic ramifications of carrying that burden for a system which benefits all of California's population is beyond comprehension.

2. The most probable scenario which would develop, over the next two to three decades, is one in which the down stream Delta Levees gradually fall into disrepair and finally fail leaving the Greater Stockton Delta an inland sea and total ecological and environmental disaster. A vast majority of the California populace will be affected with not only the loss of the farm economy on potentially 1 million acres in the North State Area but also through the subsequent failure of the Federal and State Water projects from salt intrusion.

I believe it is our primary responsibility, especially in tough economic times, to look far into the future and insure future generations the heritage, vision, and judgment afforded us by our forefathers. To approach such a complex and far reaching issue with a "Band-Aid" approach is unconscionable.

Sincerely,

Stephen F. Heringer

51375 S. Netherlands Road • Clarksburg, CA 95612 • (916) 775-1513 FAX (916) 775-1586

HERINGER RANCH DIVISION - ORIC

RESPONSE TO COMMENT 1: Policy for the Corps of Engineers requires that proposed reconstruction work will be justified incrementally by current economic considerations unless it is otherwise shown that the work is necessary for safety reasons. If an economic analysis is required, reconstruction work needed for project levees providing flood protection to a separable flood hazard area must be economically justified based on flood damages prevented in that area by such work. Separable areas with significant amounts of development, such as Marysville, will have benefit to cost ratios significantly greater than one and are therefore incrementally justified. Separable areas that are predominantly agricultural will probably be incrementally infeasible.

If the Federal interest is determined based on an incremental evaluation, levee reconstruction work that might be needed in Phases III and IV to meet existing design conditions may not be economically justified and may not be approved under the Sacramento River Flood Control System Evaluation. All work proposed under Phase II appears incrementally justified and Federal funding has been provided for advanced engineering and design efforts. For Phase III, preliminary results indicate that about 50 percent of the work is incrementally justified. Phase IV studies are still ongoing. Even if a Federal interest is shown in only some of the work that might be needed, local entities are expected to cost share in any work that might be constructed. In some areas of Phase II and Phase III, local entities have indicated that they are unwilling or unable to cost share and this position may also preclude future work.

The objective of the Sacramento River Flood Control System Evaluation, Phases I through V, is to determine that reconstruction work which is needed to insure that all levee embankments of the Sacramento River Flood Control Project can safely convey the design flood stages originally approved by Congress. Work being proposed is not designed to insure that floodflows greater than design conditions can be conveyed safely. Peak flood stages in 1986 on the Sacramento River were at or near the design stages specified for those levees. Although the Sacramento River levee embankments and foundations did exhibit seepage type problems in some areas, flood stages similar to design conditions were safely conveyed. Preliminary evaluations suggest that some of the seepage areas need repair to perform adequately as designed but long sections of the levee don't appear to need work.

Significant Federal funds have been expended in the past to provide bank protection work, for flood fight efforts, and for the repair of flood damaged levees not only along the Sacramento River but within the entire study area. The objective of this kind of work is also to insure that the project levees can safely convey the Congressionally approved design flood stages. These efforts are

expected to continue in the future, as long as flood control facilities are adequately maintained, to benefit all lands protected by the flood control project.

RESPONSE TO COMMENT 2: Significant Federal and State funds have also been expended to repair levee embankments in the Delta area and those programs providing such funds are still available. In addition, other Corps and State studies are on-going that will address the integrity of the Delta levees and increased levels of flood protection.

K U H A G E N, I N C.

P.O. Box 242
Courtland, CA 95615

January 22, 1992

U.S. Army Engineer Corps
650 Capitol Mall
Sacramento, CA 95814

RE: Draft Environmental Impact Report on Phases I - V of
the Sacramento River Flood Control System Evaluation

Gentlemen:

We would like to express our concerns with some of the issues outlined in the above-referenced impact report:

1. 1. Phase IV, the lower Sacramento River, Freeport to Collinsville, is a part of the overall river flood control/levee study. This is a study of the Sacramento River "SYSTEM" and, therefore, should be studied as a SYSTEM. It is not logical to have the various Phases studied separately like Phases I, (Sacramento) and II (Marysville/Yuba City) were. We are concerned that only the "populated" areas will get the benefit of the levee improvements (including raising the levee) whereas the smaller populated areas, such as Walnut Grove, will only get HIGHER WATER LEVELS!

2. 2. The determination of doing levee rehabilitation and raising is on the basis of cost/benefit ratios. If the area to be protected is of lower value (such as our farmland, and areas of low density population) than high value (Sacramento cities/counties and industrially zoned areas), then the costs for levee improvements to protect our farmland may not be made available us. Since we are downstream from the these so called "proper ratio" areas, we are concerned that all the Delta will receive is only the EXCESS WATER FLOW and NO LEVEE IMPROVEMENT ASSISTANCE which is greatly needed.

3. 3. In today's economy, if the Delta islands are lost, one at a time, there will be little or no money available to reclaim them, and the ability for us to live and work here as we have for generations will slowly be deteriorated, resulting not in a swamp but a sea of more than 30 feet deep of salt water which would totally ruin the Delta's environmental habitat forever. Also, due to this water contamination, the Department of Water Resources will not be able to make the through Delta transfers to the Clifton Court forebay for the beginning of the water's trip down the aqueduct.

4. 4. Even though the recession has somewhat slowed down the building of new homes in Northern California, development will never completely stop. Now that Phases I and II have been completed, areas have been freed up for future development, resulting in more water run off, down the drain and through the up-stream pumps to be sent downstream to the Delta. Again, if the study is not done on a SYSTEM WIDE BASIS, and repairs to levees are not done BEGINNING DOWNSTREAM, there will undoubtedly be more water affecting our already weakened Delta levee system.

A response to these concerns would be greatly appreciated. Any documentation you may have readily available would be gladly accepted.

Sincerely,

Garth Kuhagen
President

GK/dak

KUHAGEN, INC.

RESPONSE TO COMMENT 1: Under the current investigation, the Sacramento River Flood Control System Evaluation, the Corps of Engineers divided the Sacramento River Flood Control Project into five phases or areas so that each phase would have a manageable number of miles of levee embankment to evaluate. In addition, because of public safety, the populated areas were given priority.

The objective of the Sacramento River Flood Control System Evaluation, Phases I through V, is to determine that reconstruction work which is needed to insure that all levee embankments of the Sacramento River Flood Control Project can safely convey the design flood stages originally approved by Congress. Work being proposed is not designed to insure that floodflows greater than design conditions can be conveyed safely. In addition, the Corps has no authority in this study to raise levees to provide levels of flood protection greater than the originally authorized design levels.

Under existing maintenance and operation agreements local entities can make their own levee repairs and, in fact, are urged to do so. In areas where levee reconstruction work is not incrementally justified under the current investigation, repairs can be pursued under other programs. Significant Federal funds have been expended in the Walnut Grove area in the past to provide bank protection work, for flood fight efforts, and for the repair of flood damaged levees to insure that the project levees can safely convey the Congressionally approved design stages. These efforts are expected to continue in the future, as long as flood control facilities are adequately maintained.

RESPONSE TO COMMENT 2: Federal funds for reconstruction work proposed under the Sacramento River Flood Control System Evaluation will probably require a favorable benefit to cost ratio based on an incremental analysis. Agricultural and undeveloped areas will probably not receive Federal funds under the current investigation but will still be eligible for Federal and State funds under other programs.

RESPONSE TO COMMENT 3: Under the current investigation, the Corps has no authority to consider other purposes such as environmental restoration and water supply. The Corps can only propose reconstruction work necessary to correct design and construction deficiences inherent in the existing levees and other facilities of the authorized Sacramento River Flood Control Project. If it can be shown and supported that the potential reconstruction work would provide environmental, water quality and water supply benefits, those benefits can be considered in the incremental econmomic evaluation.

As noted above, other Federal and State programs have and are expected to continue to provide funds for flood control in the Delta area. In addition, other Corps studies are ongoing that

address some of your concerns, particularly the Sacramento - San Joaquin Delta Investigation, a cooperative study by the Corps of Engineers and State, that will evaluate levels of flood protection greater than the existing levels.

RESPONSE TO COMMENT 4: Construction of work proposed under Phase I of the Sacramento River Flood Control System Evaluation is nearly complete. This work will not provide the Federal Emergency Management Agency (FEMA) 100-year level of flood protection for the areas impacted. Potential work under Phase II has not been approved for construction and most of the areas impacted are currently not mapped by FEMA.

Any proposal for the discharge of new water into the Sacramento River Flood Control Project requires permits through The Reclamation Board and the Corps of Engineers. Certain conditions can and are being placed on these permits to prevent discharge into the system when flood stages are near, at or above design stages.

Restoration of the levees is not intended to convey peak flood stages and flows greater at any location than that which was originally authorized and designed. Based on the above, levees should not receive peak stresses greater than originally envisioned by Congress at the time of project authorization. Because of your concerns regarding flood problems associated with development, we suggest you bring such concerns to the attention of your Congressional representatives and The Reclamation Board.

OFFICE: (916) 775-1698
SHOP: (916) 775-1653
MILL: (916) 775-1282

S. H. MERWIN & SONS INC.
ROUTE 1, BOX 412
CLARKSBURG, CALIFORNIA 95612

U.S. Army Corps of Engineers
1625 J. Street
Sacramento, CA 95814-2922

RE: Draft, Environmental Impact Report on Phases II to V of the Sacramento River Flood Control System Evaluation, dated October, 1991.

Gentlemen:

I farm near Clarksburg in Reclamation District 999. I'm acquainted with farmers from here to Birds Landing. My
1. concern is that by upgrading the levees on a piecemeal basis (Phase I, II, III, etc.) the portion of the Sacramento River system above (north) of us may be tackled first, thus leaving the Delta levees unprepared, and without funding to make the improvements necessary to handle the resulting increases in water flows.

Having seen Sherman Island, and Isleton in extremis during high water, I would think that levees in the lower Delta ought to have priority, or we'll lose more reclaimed land, with the domino effect threatening.

In other words, the Sacramento River Flood Control System needs its lower end fixed before we equip the upper end to handle increased flows.

Sincerely,

Dennis Merwin

Dennis Merwin, president,
S.H. Merwin and Sons, Inc.

copies:
The Reclamation Board
Congressman Vic Fazio
Congressman Robert Matsui

S.H. MERWIN & SONS INC.

RESPONSE TO COMMENT 1: Because of the large number of miles of levee embankment, about 1,000 miles of levee, the Corps of Engineers did divide the Sacramento River Flood Control System Evaluation into five areas of study such that each area had a manageable number of levees to investigate. In addition, Phase I (Sacramento Urban Area) and Phase II (Marysville/Yuba City Area) were given priority because of the number of people in those areas and the concern for public safety. Phases I, II and III which are north of Reclamation District 999 will be addressed before Phase IV (Lower Sacramento Area) which is your area of concern.

The objective of the Sacramento River Flood Control System Evaluation, Phases I through V, is to determine the reconstruction work which is needed to insure that all levee embankments of the Sacramento River Flood Control Project can safely convey the design flood stages originally approved by Congress. Work being proposed is not designed to insure that floodflows greater than design conditions can be conveyed safely.

Peak flood stages in 1986 on the Sacramento River, Elk Slough, Sutter Slough, Miner Slough and Yolo Bypass adjacent to Reclamation District 999 were at or near the design stages specified for those levees. Although some sections of those levee embankments and foundations did exhibit seepage type problems, flood stages similar to design conditions were safely conveyed around your district. Even though our objective was met with regard to Reclamation District 999, there are concerns about the known seepage areas. The Corps is evaluating these areas and may recommend reconstruction work such that these levees will continue to perform adequately under design conditions. If reconstruction work is needed and there is no Federal interest in providing funds, then the local entities have the option of pursuing their own repairs if they so choose.

Even though the Lower Sacramento Area was not given priority in the study process, significant Federal funds have been expended in the past to provide bank protection work, for flood fight efforts, and for the repair of flood damaged levees in your area of concern. As stated above, the objective of this kind of work is to insure that the project levees can safely convey the Congressionally approved design stages. In addition, significant Federal and State funds have also been used to repair and reconstruct local levees in the Delta. These efforts are expected to continue in the future in order to provide the flood protection expected of these levee embankments.

DARRELL L. MERWIN WARREN R. MERWIN

MERWIN FARMS

ROUTE 1, BOX 105

CLARKSBURG, CALIFORNIA 95612

U.S. Army Engineer Corps
1625 J Street
Sacramento, CA 95814-2922

January 27, 1992

Dear Sirs:

We have some very definite concerns regarding the Draft Environmental Impact Report on Phase II to V of the Sacramento River Flood Control System.

1. Phase IV, the lower Sacramento River, Freeport to Collinsville, is part of the overall Sacramento River "System" and, therefore, should be studied as part of the whole system.

2. We, being farmers in the lower Sacramento River area, are very concerned that the highly populated areas will get the benefits of levee improvements, such as raising, and we will have to put up with more water flowing down the river, putting extra stress on the levees.

3. As the Phase I and II levee upgrades are finished, the areas will meet the Federal Emergency Management Agency 100 or 200 year floodplain criteria freeing the area for more development. As more areas are developed, more water will be running off and draining into the river and flowing to us downstream. If the study is not done as a system wide basis and repairs to levees are not done beginning downstream, there will be more water coming our way.

4. Please take these concerns to heart as our future in farming is in peril and reconsider the Sacramento River Flood Control System Evaluation.

Sincerely,

Darrell L. Merwin

Darrell L. Merwin
Merwin Farms, Inc.

DARRELL MERWIN
(916) 744-1434

D & G Merwin, Inc.
Farming
49518 Gaffney Road
Clarksburg, California 95612
(916) 744-1219

GARY MERWIN
(916) 744-1392

U.S. Army Engineer Corps
1625 J Street
Sacramento, CA 95814-2922

January 27, 1992

Dear Sirs:

We have some very definite concerns regarding the Draft Environmental Impact Report on Phase II to V of the Sacramento River Flood Control System.

1. Phase IV, the lower Sacramento River, Freeport to Collinsville, is part of the overall Sacramento River "System" and, therefore, should be studied as part of the whole system.

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3. As the Phase I and II levee upgrades are finished, the areas will meet the Federal Emergency Management Agency 100 or 200 year floodplain criteria freeing the area for more development. As more areas are developed, more water will be running off and draining into the river and flowing to us downstream. If the study is not done as a system wide basis and repairs to levees are not done beginning downstream, there will be more water coming our way.

4. Please take these concerns to heart as our future in farming is in peril and reconsider the Sacramento River Flood Control System Evaluation.

Sincerely,

Gary R. Merwin

Gary R. Merwin
D & G Merwin Inc.

Gaffney Farms
49522 Gaffney Road, #101
Clarksburg, CA 95612

U.S. Army Engineer Corps
1625 J Street
Sacramento, CA 95814-2922

January 27, 1992

Dear Sirs:

We have some very definite concerns regarding the Draft Environmental Impact Report on Phase II to V of the Sacramento River Flood Control System.

1. Phase IV, the lower Sacramento River, Freeport to Collinsville, is part of the overall Sacramento River "System" and, therefore, should be studied as part of the whole system.

2. We, being farmers in the lower Sacramento River area, are very concerned that the highly populated areas will get the benefits of levee improvements, such as raising, and we will have to put up with more water flowing down the river, putting extra stress on the levees.

3. As the Phase I and II levee upgrades are finished, the areas will meet the Federal Emergency Management Agency 100 or 200 year floodplain criteria freeing the area for more development. As more areas are developed, more water will be running off and draining into the river and flowing to us downstream. If the study is not done as a system wide basis and repairs to levees are not done beginning downstream, there will be more water coming our way.

4. Please take these concerns to heart as our future in farming is in peril and reconsider the Sacramento River Flood Control System Evaluation.

Sincerely,

Warren R. Merwin

Warren R. Merwin
Gaffney Farms

MERWIN FARMS, GAFFNEY FARMS, AND D&G MERWIN, INC.

RESPONSE TO COMMENT 1: Under the Sacramento River Flood Control System Evaluation, Phases II through V, the Corps of Engineers will evaluate the integrity of all project levees (about 1000 miles of levee embankment) of the Sacramento River Flood Control Project. Although each phase addresses only a portion of the levees, completion of the investigation will identify levee reconstruction work needed to correct design and construction deficiencies inherent in all the existing levees of the flood control project.

RESPONSE TO COMMENT 2: The purpose of the reconstruction work identified would be to insure that the project levees can safely convey the design flood stages originally authorized and approved by Congress. The Corps has no authority in this study to raise levees to provide levels of flood protection greater than the originally authorized design levels.

Policy for the Corps requires that proposed reconstruction work will be justified incrementally by current economic considerations unless it is otherwise shown that the work is necessary for safety reasons. If an economic analysis is required, reconstruction work needed for project levees providing flood protection to a separable flood hazard area must be economically justified based on flood damages prevented in that area by such work. Separable areas with significant amounts of development, such as Marysville, will have benefit to cost ratios significantly greater than one and are therefore incrementally justified. Separable areas that are predominantly agricultural will probably be incrementally infeasible.

If the Federal interest is determined based on an incremental evaluation, levee reconstruction work that might be needed in Phases III and IV to meet existing design conditions may not be economically justified and may not be approved under the Sacramento River Flood Control System Evaluation. All work proposed under Phase II appears incrementally justified and Federal funding has been provided for advanced engineering and design efforts. For Phase III, preliminary results indicate that about 50 percent of the work is incrementally justified. Phase IV studies are still ongoing. Even if a Federal interest is shown in only some of the work that might be needed, local entities are expected to cost share in any work that might be constructed. In some areas of Phase II and Phase III, local entities have indicated that they are unwilling or unable to cost share and this position may also preclude future work.

In areas where levee reconstruction work is not incrementally justified other means can be pursued to achieve needed repairs. Many of the levee embankment problem areas observed in the field during the February 1986 flood event have been repaired by the local maintaining agencies, by the State of California through

various State programs, and by the Corps of Engineers through emergency funded authorities. In addition, the above agencies also participate in flood fight efforts to reduce the potential for any failure. Adequate inspection and maintenance is also paramount in maintaining the existing levels of flood protection provided by the project levees. Study results from the Sacramento River Flood Control System Evaluation will be made available to State and local agencies so that specific levee repairs can be pursued by those agencies at their discretion without significant additional engineering and geotechnical studies.

Restoration of the levees is not intended to convey peak flood stages and flows greater at any location than that which was originally authorized and designed. Based on the above, levees should not receive peak stresses greater than originally envisioned by Congress at the time of project authorization.

RESPONSE TO COMMENT 3: Levee reconstruction work being implemented under Phase I (Sacramento Urban Area) will not provide Federal Emergency Management Agency (FEMA) 100-year or 200-year level of flood protection. In addition, most of the Phase II study area is not designated by FEMA as a flood hazard area and development is continuing in these areas.

During the 1986 flood event, peak flood stages and floodflows were near, at, or exceeded design conditions for most of the study area. Two levee failures, several near levee failures, and numerous levee embankment problem areas, primarily seepage type problems, resulted. Many of these were reconstructed or repaired, as indicated above, to insure that the project levees in those locations would safely convey the design flood stages originally authorized and approved by Congress. Reconstruction work proposed under Phases II through V would address those problem areas that have not been repaired to date. Levee work required to repair levee embankments that have deteriorated over time and/or are deficient in order that the project levees will do what Congress initially authorized, are not considered responsible for inducing development. Local entities can make these same repairs under existing levee maintenance agreements at any time and, in fact, are urged to do so.

RESPONSE TO COMMENT 4: Significant Federal funds have been expended in the past to provide bank protection work, for flood fight efforts and for the repair of flood damage levees in the Phase IV study area. As stated above, the objective of this kind of work is to insure that the project levees can safely convey the Congressionally approved design stages. In addition, significant Federal funds have also been used to flood fight and repair flood damaged local levees in the Delta. The Reclamation Board, in cooperation with the Corps, has cost-shared in many of the past efforts and such efforts are expected to continue in the future in your area of concern, as long as existing flood control facilities are adequately maintained.

Nadine Ohliger
Rt 1 Box 237
Colusa, CA 95932
January 13, 1992

Colonel Laurence R. Sadoff
Sacramento District, U.S. Army Corps of Engineers
1325 J Street
Sacramento, CA 95814

RE: SACRAMENTO RIVER FLOOD CONTROL SYSTEM EVALUATION

Dear Sir,

1. Since I am neither a lawyer, a biologist, a soil expert nor a PH.D. it is impossible to wade through your 167 page plus appendices and maps Draft. None were sent to the local Colusa Library and the
2. nearest hearing is tonight in Yuba City. Mr. Ricardo Pineda of the State Reclamation Board sent me a copy which I just received last Saturday. Today I placed it in our Colusa Library with a notice in the local paper so that others may see it.

I did attend the last one you had in Colusa although Mr. Pineda said we are now combined with Yuba City because the attendance was so poor at the Colusa one. I enclose the article which appeared in
3. the Yuba Appeal-Democrat after the January 6 "workshop" held there. I did not know about that occasion, either.

4. When I scanned through the report I did not find any definite times, places or work scheduled to be done on the Sacramento River. We are farmers who live and work on the river and through 27 years we have been constantly harassed by State Fish and Game, U.S. Fish and Wildlife, Bureau of Reclamation, Army Corps of Engineers, Dept. of Water Resources, Wildlife Conservation Board and numerous environmental groups.

5. I realize you have a job to do and must make an EIR/EIS but it says the same things we have already received from State & Fed Fish and Game; all about the birds and bees and nothing about human beings.

6. Enclosed is a letter I wrote alerting U.S.F&G about the role of State Dept. of Water Resources in the maintenance of the levees. At the time the U.S. wanted our riparian land to create a third refuge in our county so I thought they should realize river land is different from the rice land where they now have their refuges in Colusa County. Please note in particular the last paragraph which is highlighted. Somebody ended up placing netting on the banks of the river so the swallows would stay and be saved. Odd, eh? What about the people and town of Colusa?

Twenty-five or so years ago one of the above agencies wanted to do some work in the river or the levees. We received a letter requesting us to sign away any liability for damage done to our property by the gov't when they brought their equipment through our place. Several of we neighbors had to pay a lawyer to write the letter of refusal to sign.

Your agencies did some levee work on the river north of me creating what was called a "wetland". The property owner did not
7. think so and evidently is fighting it. In your draft DEIS-12 there

is mention of irrigation ditches or ponds possibly being relocated. This prospect goes along with the creation of wetlands AND the hand of
8. State Fish & Game looming up. On page DEIS-19 the replacement of affected habitat...Here we go again with 3 acres somewhere else to counter the one acre affected. This entire report is made to
9. placate State Fish & Game. I find they have unbelievable power not only over we residents and landowners but over the rest of these governmental agencies.

10. When State F&G buy our land they do not have to adhere to the rules of CEQua, but the rest of us do. I have been to their meetings of the Wildlife Conservation Board. They say they are "categorically exempt". How come? They are making you and the other gov't agencies perform EIR/EIS's but F&G are above it all.
11. Even State Dept. Water Resources has to get a permit from F&G to do their work along the river. It costs DWR $35.00 for the permit.

Naturally, I am more on the side of flood control and your work than I am on F&G with their goal of recreation and preservation. Incidentally, they also want us to pay $15.00 for their latest list of endangered and threatened species.

When you finally get around to phase #5 in the Colusa area on the Sacramento River (not on the Feather) I will attend your meeting.
12. Perhaps the fact that you called the Yuba City meeting "Sacramento River Flood Control" when actually dealing with the Feather River could be the reason no one showed up.

Sincerely,

Nadine Ohliger

Nadine Ohliger (Mrs. Howard Ohliger)

Enc. - 2

Workshop on status of Y-S levees draws sparse turnout

By HAROLD KRUGER
A-D Staff Writer

State and federal officials dropped by Yuba City last night to update the locals about levee repair work.

The occasion was a workshop on the Sacramento River Flood Control System Evaluation Phases II-V Programmatic Environmental Impact Statement/Environmental Impact Report, a weighty tome with a long name that examines possible effects on the environment from levee repairs.

"They haven't been a best seller," said Bud Pahl of the Army Corps of Engineers.

Judging by last night's sparse turnout — 15 people in the Sutter County Veterans Hall, which seats 640 — not many folks have waded through the document, available at the local library.

A formal public hearing will be held next Monday at 6:30 p.m., again at the Veterans Hall.

Five of last night's attendees were Yuba County officials: Supervisors Tib Belza, Joan Saunders and Mimi Mathews, Public Works Director John Wright and Emergency Services Director Kelly Purdom. No Sutter County officials attended.

Pahl and Rob Cooke of the state Reclamation Board didn't offer any new information about the Yuba-Sutter section of levee project. The Sacramento River Flood Control Project consists of about 1,000 miles of levees, plus overflow weirs, pumping plants and bypass channels that protect communities and agricultural lands in the Sacramento Valley and the Sacramento-San Joaquin Delta.

Repair work is divided into five phases. The Marysville-Yuba City area is the second phase, behind metropolitan Sacramento.

The Army Corps launched its investigation of Yuba-Sutter levees following the February 1986 flood. In 1990, the Corps recommended 22 miles of Yuba-Sutter levees be raised to provide 200-year flood protection. Preliminary cost estimates ranged as high as $12 million.

Another Corps' study recommended repairing levees to bring them up to their original design by installing 32 miles of toe drains, raising 9.8 miles of levees, and installing 1.5 miles of slurry cutoff wall and 0.4 mile of slurry cutoff trench. Cost estimates have reached $54 million.

The federal government and

See Back Page, LEVEES

1-7-92, Yuba Appeal-Democrat

Levees

Cont. from Front Page

non-federal sponsors — Reclamation Board, local cities, counties and levee districts — are supposed to split the cost. The state is supposed to pick up 70 percent of the non-federal expense, leaving local entities to pay for 30 percent of the non-federal share.

Cooke said that in addition to paying 30 percent of the non-federal share, local entities will have to agree to operate and maintain the levees and to hold the state harmless if the fixed levees fail.

He said there are three construction contracts in the Yuba-Sutter area — two on the east side of the Feather River and one in Sutter County.

Finalizing the financing package is important, he said, and "it looks like the local interests on the east side of the Feather River are very close to doing that. More work has to be done in Sutter County."

Cooke said lands, easements, rights-of-way and relocations can count as part of the local share, along with hard dollars.

"We're going to build that levee the way it was so it's strong enough to do what it was supposed to do," Pahl said.

Levee repairs should begin in 1993-94.

Last July, state and federal officials said a feasibility study for levee enhancements will take at least four years before that work can start.

The feasibility study's one-year, first-phase investigation will examine sediment transport and composition of the riverbottom in the Yuba and Feather rivers. Depending on the outcome of that study, the Army Corps may recommend other alternatives to levee enhancement, including upstream storage.

Written comments on the draft EIS/EIR will be accepted through Jan. 21 and should be sent to Army Corps of Engineers, Sacramento District, ATTN: CESPK-PD-R, 1325 J St., Sacramento, Calif. 95814-2922

From: Nadine Ohleger
Rt. 1 - Box 237
Colusa, CA. 95932

November 4, 1988

TO: U.S.Fish & Wildlife
FROM: Nadine Ohliger, Colusa, Sacramento River landowner
RE: Creation of a Sacramento River National Wildlife Refuge

Your attention should be brought to the role of the State of California Department of Water Resources in the maintenance of the river levees, the flood level of the Sacramento River and even the riparian sections of this river in the interest of Flood Control.

We who live on the river depend on this State Dept. for our very existence. I interviewed Dale Miner and Carl Worley who are the Superintendent and Assistant Superintendent for Civil Maintenance of the Department of Water Resources Maintenance Yard in Sutter, California. They are very proud of the fact that there has never been a levee failure with a levee maintained by the Dept. of Water Resources. I am, too. I live and work here.

This department, by law, is charged with performing the following duties in the interest of flood control:

1. Monitor the cubic foot flow of water so the river will not get too high and go over its banks. They clear brush, snags, trees from the banks and river bed because the debris which accumulates will impede the flow in the channel resulting in a dangerous river level.

2. Maintenance of the levee itself by spraying or burning vegetation for effective overall inspection. Burning starts July 1. They use a drag chain in heavily infested rodent areas and mow when it is too difficult to burn. They also cut brush from the levees.

3. In "jungle" areas along the river, they maintain a fire guard between these areas and the levee. They know if a fire starts in these jungles there is no way to get in to put it out. Several years ago a fire in my "jungle" burned for 5 days. We finally called our Rural Volunteer Fire Dept. when it threatened our river pump.

4. They maintain a levee patrol around the clock during the period of high water. From November 1 thru April is considered the Flood Season. They pay particular attention to several "hot spots" they know to be weak or have had to rock in the past. Two years ago they stationed a man all night at one spot to sit and watch the boiling which indicates trouble. Finally, they poured tons and tons of rock into the spot where a tree had been uprooted leaving a deep, gaping hole. The only way the trucks could approach was along the levee road. Colusa sheriffs and state Highway Patrol did guard duty to keep the public off the levee roads.

5. This department also must maintain the roads on the tops of the levees by grading, gravelling, fixing potholes and checking the locked gates across it. The levee is not a public road, but these gates are continually vandalized. If trespassers cannot break the locks, they drive around them down the sides of the levee further eroding them. Motorcycles particularly think this is great sport. Colusa County used to pay the State for levee maintenance. Two years ago they ran out of money and shifted the burden to the property owners. All of us even down through the town of Colusa pay this tax according to how much land we own and how much river frontage we have. My share

NADINE OHLIGER

RESPONSE TO COMMENT 1: Comment noted. Please contact the Corps of Engineers or State Reclamation Board staff for answers to any questions you may have regarding the project.

RESPONSE TO COMMENT 2: The Corps conducted an extensive public involvement program to solicit input on the project. This included placement of the Draft Environmental Impact Statement/Environmental Inpact Report (DEIS/EIR) in a number of local libraries. In response to your concerns and in an effort to facilitate future public review, a copy of the final environmental statement for the project will be placed in the Colusa County Library in Colusa, the Sutter County Library in Marysville and the Sutter County Library in Yuba City.

RESPONSE TO COMMENT 3: News release announcing the Yuba City workshop and public hearing were in the Yuba Appeal-Democrat on December 27 and December 28, 1991. The newspaper article which you enclosed, dated January 7, 1992 was prepared by the Yuba Appeal-Democrat staff and was a news account of the workshop held the night before.

RESPONSE TO COMMENT 4: There is no definitive construction date for the proposed project. As discussed in Section 2.0 Project Description and Section 2.3 Project Approval Process, the project will be conducted in four phases commencing with the Marysville/Yuba City area and concluding with the Upper Sacramento River area. Prior to undertaking work on any of these phases, the current programmatic EIS\EIR must be certified. Also, prior to construction each phase of the project would require approval of an Initial Appraisal Report and supporting documents, advanced engineering and design studies, and further environmental reports for the particular phase under consideration. The initial appraisal reports for phases II - V should be completed by 1994.

RESPONSE TO COMMENT 5: The text of Section 3.1 No Action has been revised to include additional description of the impacts of flooding on socioeconomic conditions.

RESPONSE TO COMMENT 6: Your comments to the United States Fish and Wildlife Service regarding a national refuge are noted; however, a discussion of land requirements for a wildlife refuge are outside the scope of this document. With regard to levee maintenance, the Corps is involved in a team effort with State agencies to preserve and maintain vegetation in the Sacramento River system to the extent feasible.

RESPONSE TO COMMENT 7: Relocation of any ditches or ponds will not be to create wetlands. Relocations will conform to existing uses.

RESPONSE TO COMMENT 8: The discussion on page DEIS 19 mentions several mitigation options but does not discuss any specific ratios or land acquisition to provide for compensation of environmental

losses. As discussed in Section 7.0 Environmental Commitments, once specific work sites are identified, the exact acres of the impacted vegetative type would be determined. Fish and Wildlife Service, Department of Fish and Game, and the Corps would complete a Habitat Evaluation Procedure for the project to determine actual mitigation requirements.

RESPONSE TO COMMENT 9: We disagree. The purpose of the DEIS/EIR is to satisfy Federal and State environmental laws and regulations and comply with the agencies' commitment to environmental protection of the affected resources.

RESPONSE TO COMMENT 10: The Corps is required to prepare EIS's under the NEPA. State of California is required to prepare to prepare EIR's under CEQA.

RESPONSE TO COMMENT 11: Comment noted.

RESPONSE TO COMMENT 12: The public was in attendance at both the public workshop and hearing. However, in response to your concern and to encourage greater participation in the future, public notices will include specific reference to the waterways under study as part of the Sacramento River system.

Pacific Gas and Electric Company
Sacramento Valley Region

2740 Gateway Oaks Drive
Sacramento, CA 95833
916/923-7000

January 8, 1992

U.S. Army Corps of Engineers
Sacramento District, ATTN: CESPK-PD-R
1325 J Street
Sacramento, CA 95814-2922

Gentlemen:

RE: Sacramento River Flood Control System Evaluation, Phase II-V

The Draft Programmatic Environmental Impact Statement/Environmental Impact Report (EIR/EIS) for the Sacramento River Flood Control System Evaluation, Phases II-V, has been reviewed by Pacific Gas & Electric Company (PG&E). The following comments are provided to offer information that will assist the Corps of Engineers with its levee reconstruction proposal.

The draft EIR/EIS describes the investigation of alternative methods of levee reconstruction for flood control in the study area which include the Sacramento River and tributaries from Red Bluff to Collinsville. PG&E
1. owns and operates an extensive network of gas and electric distribution and transmission lines throughout the study area. These facilities are located adjacent to, along, over, through and under levees in numerous locations. It is vital that the operation and integrity of these facilities are not jeopardized or interrupted by the reconstruction of the levees.

2. PG&E is most interested in the proposed project as it may require the modification to and or relocation of its facilities to accommodate the Corps of Engineers plans. Special attention should be given to the levee reconstruction method where underground conduits and pipelines are located as modifications to and or relocation of these facilities can be very expensive. Costs incurred by PG&E for the alteration of its facilities will be borne by the project proponent.

3. Close coordination and planning between the Corps of Engineers and PG&E is vital. PG&E recommends that when the method of reconstruction is identified and preliminary plans are developed for specific levee locations, copies of the plans are provided as soon as possible to PG&E for review and comment. We will then be able to focus on these areas to identify utility lines and provide comments with regards to the need to alter the facilities, project scheduling, engineering, materials leadtime and method of construction. The above process will help to insure that the Corps of Engineers attains success with its levee restoration project.

Should you have any questions or need additional information, please contact Bob Olivieri of my staff at the above letterhead address, or by calling (916) 923-7264.

Sincerely,

Greg Johnston

Greg Johnston
Supervisor of Land Planning

RLO(92-002.LTR):mah

PACIFIC GAS AND ELECTRIC COMPANY

RESPONSE TO COMMENT 1: The Corps of Engineers will coordinate potential relocations of facilities with the concerned agencies in the engineering and design phase of the study to minimize or eliminate any future interruption of service. Coordination efforts will continue until construction is complete.

REPONSE TO COMMENT 2: Relocation of facilities, particularly PG&E gas and electric distribution and transmission lines, can have a significant impact on designs and costs associated with potential levee reconstruction work. The Corps' final design for any particular levee location will be the most cost effective method. Any costs associated with relocations will be the responsibility of the local sponsor, in this case, The Reclamation Board (State of California).

RESPONSE TO COMMENT 3: When the extent and scope of reconstruction work is known, the Corps, in cooperation with the local sponsor, will coordinate with PG&E to determine type and extent of PG&E facilities. Your comments and concerns regarding potential relocations will assist us in developing the most cost effective method of levee reconstruction.

MR. COOK : -- was coming and we didn't attend and we haven't had prior information, at least I haven't, on the Environmental Impact Report and Environmental Impact Statement, and I am not prepared to comment on the substance at this time having only seen it for the first time tonight.

What I would like to say, though, is that this is a
1. major project. I think you realize that, and I don't believe that the public participation has been that great, I think primarily because of lack of notice, or you can say lack of attention, but in any event, I believe that the public is seriously interested in this and I believe also, from what I understand, that there is not even a copy of the Environmental Impact Report at the local library.

Whether there is or not, I would think that it would require more than a few more days -- as I understood just a minute ago, the cutoff period for comment is the 21st of this month. If so, there are only a few days to comment on
2. something of major importance and I would like to make the request and I see no reason why it would be a burden to anyone, to extend the comment period an additional month.

This meeting tonight will get publicity. Your last meeting of a week or two ago received publicity, and, in fact, that's how I discovered the meeting.

And I believe that people would be interested in coming and determining what's happening, so I think in the

interest of wide public comment or at least wider public participation, that this should be extended.

Thank you.

MR. RABBON: Thank you, Mr. Cooke.

The intent tonight is not to answer some questions so much as to receive the public input. We are available to answer clarifying questions, and Mr. Cook , I think it is very important that you submit in writing before the 21st your request for a time extension. That's very critical.

MR. COOK : Pardon me. In other words, the oral comments are not noted?

MR. RABBON: They are noted tonight. We will take that under consideration, but it will be more helpful if we also get it in writing before us to consider it for action. We will not be able tonight to tell you if we can provide that extension.

MR. COOK : No, I realize that. Are you saying you do need a written request for that extension of time?

MR. RABBON: It is recorded tonight. I am saying it would be helpful if you also provided that in writing before the 21st.

MR. COOK : Thank you.

MR. RABBON: We have Jim and Meg Burgin, and it says you want to submit a written statement.

Would you like to -- are you here to also read that

statement this evening? We would like to have a copy of the statement, please.

MS. BURGIN: My name is Meg Burgin. My husband Jim and I have formed an organization referred to as CARP. The acronym stands for Citizens Against River Pollution, and basically, it's the same format of a letter that we have circulated to the agencies over the last few months since our park renovation at the east end of Pennington Road, and the letter reads:

> The purpose of this letter is to solicit your support for your endorsement of the formation of CARP. My mission is to provide local residents of the area an oppportunity for proactive involvement in an environmental clean-up campaign. I seek to create a sense of community involvement, pride and stewardship for our bicounty parks and waterways.
>
> We are calling for regular meetings to be held on Fridays during lunch, to discuss the problem associated with boating, camping, hunting and fishing in the recreation areas that lie within our levee systems, and the potential solutions for the Yuba-Sutter area.
>
> The growing problems within our levee system

are everyone's business. All interested individuals, groups and agencies are invited to express their views regarding this issue. For accuracy, all facts and statements should be submitted in writing. By working together we can make a difference.

In 1955 and 1986, we experienced the largest volume of floodwaters in the Sacramento River since the development of the levee system.

Our levees are no longer maintained by volunteers who served on various levee
1. districts. Notations of degradation by ATV's (all-terrain vehicles), 4-WD's (four-wheel drives), rodents and others impairments have been monitored, only at a bare minimum. That's what CARP is all about. If we don't change things, who will?

2. Little or nothing has been done to monitor or improve the recreational areas within our levee systems. Budgetary constraints have prevented existing agencies from addressing these growing problems. It is imperative for all of us who pay taxes and live in these areas to be informed of the problems associated with these conditions.

Everyone who uses the waterways in the Yuba-Sutter area should feel strongly enough to help put a stop to the damage done by a few people who are uninformed or just don't care.

3. Long-term solutions are, according to the April 15, 1991, Army Corps of Engineers and the Reclamation Board of the State of California fact sheet, "The aftermath of the '86 flood authorized the existing levee system to restore and evaluate long-term solutions to the flood control program for the Sacramento area."

Just how much do you know about this evaluation, protection and restoration of our levee system?

Those of you who are interested in protecting our recreational waterways and levee systems are invited to attend these informal meetings to discuss solutions to the problems in our area.

If you have any questions or concerns, we have copies of these letters available to any of you who would like to take them with you tonight.

Thank you.

MR. RABBON: Thank you.

The third name we have here for submitting a written statement is Mr. Van Alstyne with the Sacramento River Preservation Trust.

Would you like to present that tonight?

MR. VAN ALSTYNE: Our Executive Director will submit that. I am just here to see what's going on.

MR. RABBON: Okay, thank you.

That is the list that was submitted to me of those that wished to speak tonight.

Is there anybody else that would like to present oral or written comments at this hearing this evening?

MR. STORM: I have a question more than a presentation. I am an archaeologist and I guess I am having trouble getting used to having the biologists be the bad boys instead of us.

1. Can you tell me what the archaeological mitigation or procedures are?

MR. WELSH: The entire cultural resource evaluation program will be conducted in accordance with the 106 process. That's a process that is conducted in consultation with the State Historic Preservation Officer and the Federal Advisory Council on Historic Preservation, and it will consist of inventorying the construction through the project areas, identifying possible resources and coordinating those findings with the Historic Preservation Officer and the

Advisory Counsel on Historic Preservation, and preparing a memorandum of agreement or understanding, I'm not sure what the right term is, with those two organizations to conduct the mitigation which can consist of an array of different types of activities.

Basically, it depends on what we find and what they tell us we have to do.

MR. STORM: Has any of this been done yet?

MR. WELSH: The inventory for -- I think -- well, one of them has been done and the second phase, the third phase, which is the Mid Valley portion, is just getting under way.

So the detailed analysis goes hand in hand with the detailed project design.

MR. STORM: Thank you.

MR. RABBON: Are there any other comments or questions from the audience?

MR. LANTERMAN: My name is Roy Lanterman. I am with the Yuba County Water Agency Board of Directors.

1. I just merely wanted to point out that we are quite interested in seeing this project furthered as rapidly as possible in order to insure that flood control protection is at maximum and is maintained for this area.

2. And some of us in our organization feel sure that there may be need for other measures besides merely levees,

but we are prepared to back in any way we can and show leadership in the matter of seeing that the project moves forward and is funded at the earliest possible time.

So, while agencies such as ours are often blamed for a lot of the ills in the various environmental network and so forth, I would like to just point out our organization is willing to proceed and see that it is not stymied because of lack of sufficient funding.

MR. RABBON: Thank you. And to add a little bit to what you have said, Mr. Lanterman, Rob Cooke, the Project Manager for Phase II of the proposed project, which is in this area, will be responsible for facilitating that local coordination effort.

MR. BAILEY: My name is Gordon Bailey and we are in Phase III. I am from Reclamation District 1500.

In your Phase III here you are going to do all these things to our levees, blanket on the outside and all this, but yet, we are sitting here with Unit 44 that has been moved from 42 to 43, 44, and all it is doing is getting bigger and bigger.

What good is it going to do if the environmentalists are stopping you from doing bank protection work here for this? I mean, a hole is a hole. It doesn't make any difference, you guys can patch 40 miles and we have 55 miles of levees around us, and this one project has been in the

PUBLIC HEARING, YUBA CITY, JANUARY 13, 1992

WALTER COOK

RESPONSE TO COMMENT 1: Please refer to Responses to Comments 1-3, to Walter Cook's written comments.

RESPONSE TO COMMENT 2: Please refer to Response to Comment 1, to Walter Cook's written comments.

MEG BURGIN

RESPONSE TO COMMENT 1: The State Reclamation Board, which has oversight responsibilities for levee maintenance, is aware of the problems you cite regarding degradation of recreational areas and is attempting to develop solutions.

RESPONSE TO COMMENT 2: Comment noted.

RESPONSE TO COMMENT 3: The study was authorized in response to a State request for an investigation of the integrity of the Sacramento River Flood Control Project. The purpose of this study is to determine the long-term integrity of the extensive Sacramento River Flood Control Project levees and to develop alternative repair solutions. The Corps of Engineers has been involved in flood control efforts on the Sacramento River and its tributaries since 1917 and has extensive background in the protection and restoration of the levee system.

MR. STORM

RESPONSE TO COMMENT 1: Cultural resource studies will be conducted in accordance with Section 106 of the National Preservation Act of 1966 as amended and other authorities. The Section 106 process outlines the procedure for a Federal agency to follow in determining the effect on historic properties. These steps are completed in consultation with the State Historic Preservation Office and the Advisory Council on Historic Preservation. Required actions under Section 106 include the location of cultural resources (literature review and field inventory), evaluation for the National Register of Historic Places, and development of mitigation measures for those resources which qualify for the National Register.

With regard to cultural studies, the following steps have been or will be completed for the systems evaluation. A literature search has been completed for Phases II through V. Field surveys have been completed for Phases II and III. The survey for Phase IV will be initiaed in the near future. The Phase V survey will probably be undertaken in fiscal year 1993. Archeological sites were found during the Phase II and III surveys. These sites are being evaluated under the criteria of the National Register of Historic Places to determine if they qualify. Any further sites found during the Phase IV and V surveys will be similarly

evaluated.

Mitigation for affected historic properties will be determined after the surveys are completed. Mitigation would be accomplished through a Memorandum of Agreement among the Corps, the non-Federal sponsor, the State Historic Preservation Officer, and the Advisory Council on Historic Preservation. Requirements are stipulated in Section 106 of the National Historic Preservation Act of 1966 and implementing regulations 36 CFR 800 and Corps Regulation 1105-02-100.

ROY LANTERMAN

RESPONSE TO COMMENT 1: Comment noted.

RESPONSE TO COMMENT 2: The scope of the investigation is limited to developing construction alternatives which would provide the Congressionally authorized design levels of flood protection. Levee reconstruction alternatives do include drainage improvements on the landward side of the levees and stabilizing berms.

MR. COUNTRYMAN: You don't mind if I come up here, force of habit.

My name is Joe Countryman. I am with the firm of Murray, Burns & Kienlen, an engineering firm here in Sacramento, and I am here tonight speaking for the California Central Valley Flood Control Association and several reclamation districts in the Delta, which our firm represents.

1. Basically we find the report did a very good job of outlining impacts and potential mitigations.

We believe that there are some things unsaid in the
2. report that we feel very strongly about. One is that the flood control system is one system and it was constructed and authorized as one system, and we do not believe that it should be repaired incrementally. We feel it should be brought up to the promised design standard as one whole system, including all the benefits from the system when evaluating the economic feasibility of doing the work.

We think that's a very important action. I realize that wasn't really addressed in the EIR, but I just would like to have that on the record.

3. Secondly, we believe that the no-action plan has underestimated damages that will occur both to the environment and to the public without the project.

For instance, any of the Delta islands that we lose

4. due to a failure of the levee will have very significant ecological environmental impacts that we don't believe were fully addressed in the project itself.

I'm not quite sure of the propriety of evaluating the no-action plan, it seems to us the no action -- that is not doing the work, has significant environmental negatives associated with it.

5. The other thing that may not have been completely addressed is the cost of rehabilitating failed levees, and we believe that if these levees are not brought up to acceptable Corps of Engineers design standards, we are facing failure of the levees.

6. Another issue that was not maybe addressed to the degree that we would like to see is the water quality impacts of levee failures in the Delta and the benefits that are gained from having safe levees that don't fail.

Finally, one of the issues discussed and described
7. was the impacts of shaded riverine. We have experienced difficulty in the Delta as to defining shaded riverine.

Is this actually vegetation that casts a shadow on the waters or is it simply the vegetation that is inside the levee crown? Those two things aren't necessarily the same thing and sometimes when mitigation is being calculated any vegetation that is lying on the waterside of the crown is considered to be shaded riverine, and depending on the

height of the levee and the slope and so forth, that may or may not happen.

Another thing in the Delta is that if you have a reach of levee that is facing south, you may not get any shaded riverine and the reason I am sort of being picky on this is that mitigation for shaded riverine is very expensive, and if we have to mitigate for shaded riverine, I think we should be very sure that we are mitigating for something that we are actually taking away.

Another thing along the shaded riverine issue is if 8. you are in the Delta and you have a wide expanse of water, what is the benefit of the shaded riverine? In other words, it is hard to believe or it is highly unlikely it is providing any temperature effects as opposed to when you are going up the river.

When you have a narrow band of river, you may have a great deal more effect on temperature than if you are in the Delta where you have wide areas.

We will be providing written comments to the Corps. I am not prepared to hand those out right at the moment, but 9. our Association will be providing those and we want to emphasize that we strongly support this project.

Many of the reclamation districts that are in our Association are responsible for doing the operation and maintenance of these levees and we feel it is imperative

PUBLIC HEARING
CITY OF SACRAMENTO
JANUARY 14, 1992

MR. JOE COUNTRYMAN

RESPONSE TO COMMENT 1: Comment noted.

RESPONSE TO COMMENT 2: The Corps of Engineers has given extensive consideration to the system economic evaluation argument, but current Corps policy and guidance requires that proposed reconstruction work will be justified incrementally by current economic considerations unless it is otherwise shown that the work is necessary for safety reasons. If an economic analysis is required, reconstruction work needed for project levees providing flood protection to a separable flood hazard area must be economically justified based on flood damages prevented in that area by such work. Separable areas with significant amounts of development, such as Marysville, will have benefit to cost ratios significantly greater than one and are therefore incrementally justified. Separable areas that are predominantly agricultural will be incrementally infeasible.

RESPONSE TO COMMENT 3: Additional discussion of the No Action alternative impacts has been added to the text. Please refer to Response to Comments 3 and 4, California Central Valley Flood Control Association; Comment 5, Nadine Ohliger; and Comment 11, Walter Cook's written comments.

RESPONSE TO COMMENT 4: It is assumed that the breaks in the Delta levees would ultimately be repaired. However, there could be significant short-term environmental impacts associated with levee failure. Please refer to the Response to your Comment 3 for additional discussion.

RESPONSE TO COMMENT 5: The economic evaluations do include the costs associated with a levee break(s) under the without project condition. In addition, dewatering costs for a flooded area have also been considered.

RESPONSE TO COMMENT 6: Additional discussion of water quality impacts has been added. Please refer to Response to Comment 4, California Central Valley Flood Control Association.

RESPONSE TO COMMENT 7: The definition of riverine habitat has been clarified. Please refer to Response to Comment 6, California Central Valley Flood Control Association.

RESPONSE TO COMMENT 8: Although the benefits of shaded riverine do lessen in wide expanses of water, the habitat remains important for fishery resources.

RESPONSE TO COMMENT 9: Comment noted.

February 3, 1992

U.S. Army Engineers Corps
650 Capitol Mall
Sacramento, Ca. 95814

Sirs:

My name is Gary Pylman, owner and operator of Pylman Farms, farming 500 ac. in the Sacramento Delta, just south of Clarksburg, I am also a board member of Reclamation District 150 which serves Merritt Island.

I have several concerns regarding the Draft EIR Report on Phases II to V of the Sacramento River Flood Control System Evaluation written in October of 1991.

1. 1. Phase IV, the lower Sacramento River, Freeport to Collinsville, is a part of the overall river flood control/levee study, This is a study of the Sacramento River "System" and, therefore, should be studied as a system. It is not logical to have the various Phases studied separately. (Phases I, Sacramento, and Phase II, Marysville/Yuba City, are already complete.)

   The concern: The populated areas will get the benefit of the levee improvements (including raising) and we will get the extra water (in some cases estimated plus 4' at Walnut Grove).

2. 2. The determination for doing levee rehabilitation and raising is on the basis of cost/benefit ratios. If the area to be protected is of lower value (farmland, low density population) than high value (city, industrial) then the costs are hard to justify.

   The concern: Being downstream from "proper ratio" areas, we will again receive the water and little help on our levees.

3. 3. If the Delta islands are lost, one at a time, and there is little or no money available to reclaim them, the ability to live and work here will slowly be lost as will the creation not of a swamp, but of an inland sea 15 to 30 feet deep, ruining not only the Delta but the capacity to transfer water to the South.

   The concern: The Department of Water Resources will not be able to make the through Delta transfers to the Clifton Court fore-bay for the beginning of the water's trip down the aqueduct.

Second concern: As stated, the former 800,000 acre Delta swamp will not return, but predominately it will be a white cap wave ridden inland sea, filled with quite salty water, This would be an environmental nightmare.

4. When the Phase I and II levee upgrades are finished, the areas will meet the Federal Emergency Management Agency 100 year or 200 year floodplain criteria freeing the area for more development (currently Sacramento is under a temporary waiver). As
4. more area is developed, more water will be running off, down the drain and through the upstream pumps to be sent downstream to us.

The concern: If the study is not done on a system wide basis and repairs to the levees are not done beginning downstream, there will undoubtedly be more water coming our way.

In my opinion, this is plenty about which to be concerned. The
5. impact of these matters upon my district, which having to bear directly all the costs of major levee repair or replacement, would significantly increase my annual assessments and possibly my ability to economically farm.

Sincerely,

Gary Pylman

Gary Pylman
Pylman Farms
P.O. Box 422
Clarksburg, Ca. 95612

February 3, 1992

The Reclamation Board
1416 Ninth Street
Sacramento, Ca. 95814

Sirs:

My name is Chris Bogle, operator of Bogle Vineyards Inc. farming 1,000 ac. in the Sacramento Delta, just south of Clarksburg, I am also a board member of Reclamation District 150 which serves Merritt Island.

I have several concerns regarding the Draft EIR Report on Phases II to V of the Sacramento River Flood Control System Evaluation written in October of 1991.

1\. 1. Phase IV, the lower Sacramento River, Freeport to Collinsville, is a part of the overall river flood control/levee study, This is a study of the Sacramento River "System" and, therefore, should be studied as a system. It is not logical to have the various Phases studied separately. (Phases I, Sacramento, and Phase II, Marysville/Yuba City, are already complete.)

. The concern: The populated areas will get the benefit of the levee improvements (including raising) and we will get the extra water (in some cases estimated plus 4' at Walnut Grove.)

2\. 2. The determination for doing levee rehabilitation and raising is on the basis of cost/benefit ratios. If the area to be protected is of lower value (farmland, low density population) than high value (city, industrial) then the costs are hard to justify.

The concern: Being downstream from "proper ratio" areas, we will again receive the water and little help on our levees.

3\. 3. If the Delta islands are lost, one at a time, and there is little or no money available to reclaim them, the ability to live and work here will slowly be lost as will the creation not of a swamp, but of an inland sea 15 to 30 feet deep, ruining not only the Delta but the capacity to transfer water to the South.

The concern: The Department of Water Resources will not be able to make the through Delta transfers to the Clifton Court forebay for the beginning of the water's trip down the aqueduct.

Second concern: As stated, the former 800,000 acre Delta swamp will not return, but predominately it will be a white cap wave ridden inland sea, filled with quite salty water. This would be an environmental nightmare.

4. When the Phase I and II levee upgrades are finished, the areas will meet the Federal Emergency Management Agency 100 year or 200 year floodplain criteria freeing the area for more development (currently Sacramento is under a temporary waiver). As
4. more area is developed, more water will be running off, down the drain and through the upstream pumps to be sent downstream to us.

The concern: If the study is not done on a system wide basis and repairs to the levees are not done beginning downstream, there will undoubtedly be more water coming our way.

In my opinion, this is plenty about which to be concerned. The
5. impact of these matters upon my district, which having to bear directly all the costs of major levee repair or replacement, would significantly increase my annual assessments and possibly my ability to economically farm.

Sincerely,

Chris C. Bogle

Chris C. Bogle
Bogle Vineyards
37740 County Road 144
Clarksburg, Ca. 95612

GARY PYLMAN

CHRIS C. BOGLE

RESPONSE TO COMMENT 1: The Corps of Engineers has given extensive consideration to the use of a system economic approach for our evaluation of the Sacramento River Flood Control Project. The system economic approach would allow us to compare the total cost of reconstruction work needed for the Sacramento River Flood Control Project to the total benefits derived from such work. The original project was authorized and approved by Congress based on the fact that benefits derived exceeded the total cost of flood control features that would be constructed. In addition, development adjacent to project levees and the plan formulation efforts for upstream dams and reservoirs assumed that the entire system would perform as Congress envisioned.

Current Corps' policy and guidance restrict us to an incremental economic evaluation of separable flood hazard areas. That is, reconstruction work needed for project levees providing flood protection to a separable flood hazard area (Reclamation District 150 is considered a separable flood hazard area) must be economically justified based on flood damages prevented in that area by such work.

Separable flood hazard areas with significant amounts of development, such as Marysville, will have benefit to cost ratios significantly greater than one and are therefore incrementally justified. Separable areas that are predominantly agricultural will probably be incrementally infeasible. If reconstruction work is needed and there is no Federal interest in providing funds under this investigation, then the local entities have the option of pursuing their own repairs if they choose.

The objective of the Sacramento River Flood Control System Evaluation, Phases I through V, is to determine that reconstruction work is needed to insure that all levee embankments of the Sacramento River Flood Control Project can safely convey the design flood stages originally approved by Congress. Work being proposed is not designed to insure that floodflows greater than design conditions can be conveyed safely. In addition, the Corps has no authority in this study to raise levees to provide levels of flood protection greater than the originally authorized design levels.

RESPONSE TO COMMENT 2: Significant Federal funds have been expended in the past to provide bank protection work, for flood fight efforts, and for the repair of flood damaged levees not only for Merritt Island but all project levees in the Phase IV study area. The objective of this kind of work is also to insure that the project levees can safely convey the Congressionally approved design stages. In addition, significant Federal funds have also been used to flood fight and repair flood damaged local levees in

the Delta. The Reclamation Board, in cooperation with the Corps, has cost-shared in many of the past efforts and such efforts are expected to continue in the future, as long as flood control facilities are adequately maintained.

RESPONSE TO COMMENT 3: The Corps has no authority under the current investigation to propose reconstruciton work for the purposes of water transfer and environmental concerns. However, significant Federal and State funds have been expended in the Delta area to maintain existing levels of flood protection under different programs and such expenditures are expected to continue in the future.

RESPONSE TO COMMENT 4: The levee embankments around Merritt Island generally performed as Congress envisioned in the February 1986 flood event. Peak flood stages then were at the design levels and floodflows were conveyed safely around your area of concern. Only minimal amounts of reconstruction work may be needed around Merritt Island to insure that the levee embankments will continue to perform adequately under design conditions.

Phase I reconstruction work is nearly completed but will not provide the Federal Emergency Management Agency (FEMA) 100-year level of flood protection for the impacted areas. Reconstruction work proposed under Phase II is not approved for construction and most of the impacted areas are not currently designated as flood hazard areas by FEMA. Development is continuing in and around the PhaseII study area.

Any proposal for the discharge of new water into the Sacramento River Flood Control Project requires permits through The Reclamation Board and the Corps of Engineers. Certain conditions can and are being placed on these permits to prevent discharge into the system when flood stages are near, at, or above design stages. Because of your concerns with development, we suggest you bring such concerns to the attention of your Congressional representatives and The Reclamation Board.

RESPONSE TO COMMENT 5: Under existing operation and maintenance agreements, the local levee maintaining agencies are responsible for repair and replacement to insure that the levee embankments can safely convey the design flood stages. Federal assistance can and has been requested when such repair places undue financial burden on the local entities.

sacramento river preservation trust

U.S. Army Corps of Engineers
Sacramento District
Attn: CESPK-PD-R
1325 J Street
Sacramento, CA 95814-2922

January 20, 1992

To Whom It May Concern,

The Sacramento River Preservation Trust would like to make the following comments concerning the Draft Programmatic Environmental Impact Statement/Environmental Impact Report for the Sacramento River Flood Control System Evaluation, Phases II-V:

1. 1) The alternative of setting levees back from their current location is not discussed at all. The Trust believes this to be a critical oversight and requests such consideration prior to the issuance of the final EIS/EIR for this project. (Put another way, we don't just need a stronger bathtub, we need a *larger* one.)

2. 2) The "brush" used to "paint" the environmental impacts of this proposed project is very broad. We believe that each *phase* of this project requires an EIS/EIR in its own right. Therefore, we hereby request that the Trust be notified of any and all subsequent review activity concerning this project. Such notice should be sent to the address listed on our letterhead.

Your consideration of our comments is appreciated. We look forward to your response.

Sincerely,

J. B. M

John B. Merz
Chair, Board of Directors

cc. Executive Committee
Interested Parties

Environmental Federation of California Member

P.O. Box 5366, Chico, CA 95927
(916) 345-1050

Recycled Paper

SACRAMENTO RIVER PRESERVATION TRUST

RESPONSE TO COMMENT 1: Under the present investigation, Sacramento River Flood Control System Evaluation, the Corps of Engineers can only propose reconstruction work necessary to correct design and construction deficiencies inherent in the existing levees and other facilities of the authorized Sacramento River Flood Control Project. The purpose for the reconstruction work, if implemented, would be to insure that the existing project levees can safely convey the design flood stages originally authorized by Congress. The Corps has no authority in this study to construct new levees or to modify the extent or scope of the existing flood control system.

Although the Corps has no authority in this study to consider setting levees back from their current position, local entities do have the option of seeking new Congressional authority to evaluate those kinds of alternatives.

RESPONSE TO COMMENT 2: Refer to response to Comment 1, City of West Sacramento Community Development Department. The Sacramento River Preservation Trust will be added to the mailing list of recipients for the Final EIS/EIR (FEIS).

Reclamation District 744
P.O. Box 517
Clarksburg, CA. 95612

February 23, 1992

U.S. Army Engineer Corps
650 Capitol Mall
Sacramento, Ca. 95814

Dear Sir:

We the Trustees of Reclamation District 744 are writing in regards to the ongoing Sacramento River Flood Control Evaluation phases II-IV.

1. Reclamation District 744 is located 3 miles south of the town of Freeport in the northern part of the area designated as area IV. We are concerned that up stream levee improvements in areas I-III are being and will continue to be made without a firm commitment that equal or greater improvements will be made to levees protecting down stream area IV. Our fear is that based upon the cost/benefit ratios, improvements will be made to levees protecting developed areas and areas which will likely be developed in the near future, and not in the undeveloped area IV. If this occurs, Reclamation District 744 will be at greater risk not only from higher flows due to upstream levee improvements, but also from increased flow of drainage from new developments made possible because of increased flood protection from improved levees in North Sacramento County, Yolo County and Southern Sutter County.

As development occurs, drainage volume becomes greater and more rapid. If this water is pumped into the Sacramento River System, then all downstream areas will be impacted by higher flows, more seepage, and greater flood risk.

2. We believe that there is already a problem in the South Sacramento County, North San Joaquin County flood control system

drainage and therefore increased flows enter a flood control system which is unable to protect down stream property, a flood control system which failed in February 1986 in the Thornton and Walnut Grove areas.

3. We urge you to consider as part of this study, how changes in land use from agriculture to development in North Sacramento County, Yolo County and South Sutter County will impact down stream residents, not only considering levee improvements needed, but also development of techniques to reduce drainage flows from developing areas to more nearly equate to historical drainage patterns. A flood control-drainage plan should be completed prior to further development along the Sacramento River which might increase the risk of downstream flooding.

4. In addition, we do not believe the flood control system should be broken down into phases to be improved or not improved based upon cost/benefit ratios of each area separately. It should be studied and improved as a complete system with the goal of providing adequate and equal protection for all.

Sincerely,

Russell Evan van Loben Sels

Russell E. van Loben Sels
President of the Board of Trustees

RECLAMATION DISTRICT 744

RESPONSE TO COMMENT 1: The objective of the Sacramento River Flood Control System Evaluation, Phases I through V, is to determine the reconstruction work needed to insure that all levee embankments of the Sacramento River Flood Control Project can safely convey the design flood stages originally approved by Congress. Work being proposed is not designed to insure that floodflows greater than design conditions can be conveyed safely.

Peak flood stages in 1986 on the Sacramento River adjacent to Reclamation District 744 were at the design stages specified for that levee. Although the levee embankment and foundation did exhibit seepage type problems in some areas, flood stages similar to design conditions were safely conveyed by your district. Even though our objective was met with regard to your area, there are concerns about the known seepage areas. The Corps is evaluating these areas and may recommend reconstruction work such that this levee will continue to perform adequately under design conditions. If reconstruction work is needed and there is no Federal interest in providing funds, then the local entities have the option of pursuing their own repairs if they so choose.

If Federal interest (under the current investigation) is determined based on an incremental economic evaluation, reconstruction work proposed for developed areas will probably be justified whereas work for agricultural areas will not be justified. All work proposed under Phase I was incrementally justified and that construction is nearly completed. All work proposed under Phase II appears incrementally justified and Federal funding has been provided for advanced engineering and design efforts. For Phase III, preliminary results indicate that about 50 percent of the work is incrementally justified. Phase IV studies are still ongoing. Even if a Federal interest is shown in only some of the work that might be needed, local entities are expected to cost share in any work that might be constructed. In some areas of Phase II and Phase III, local entities have indicated that they are unwilling or unable to cost share and this position may also preclude future work.

In areas where levee reconstruction work is not incrementally justified other means can be pursued to achieve needed repairs. Many of the levee embankment problem areas observed in the field during the February 1986 flood event have been repaired by the local maintaining agencies, by the State of California through various State programs, and by the Corps of Engineers through emergency funded authorities. In addition, the above agencies also participate in flood fight efforts to reduce the potential for any failure. Adequate inspection and maintenance is also paramount in maintaining the existing levels of flood protection provided by the project levees. Study results from the Sacramento River Flood Control System Evaluation will be made available to State and local agencies so that specific levee repairs can be pursued by those

agencies at their discretion without significant additional engineering and geotechnical studies.

Phase I reconstruction work will not provide Federal Emergency Management Agency (FEMA) 100-year criteria for floodplain development. In addition, most of the area in Phase II is not designated by FEMA as a flood hazard area and development is taking place today.

Any proposal for the discharge of water into the Sacramento River Flood Control Project requires permits through The Reclamation Board and th Corps of Engineers. Certain conditions can and are being placed on these permits to prevent discharge into the system when flood stages are near, at or above design stages. Restoration of the levees is not intended to convey peak flood stages and flows greater at any location than that which was originally authorized and designed. Based on the above, levees should not receive peak stresses greater than originally envisioned by Congress at the time of project authorization. Because of your concerns regarding flood problems associated with development, we suggest you bring such concerns to the attention of your Congressional representatives and The Reclamation Board.

RESPONSE TO COMMENT 2: The levee failures in February 1986 in the Thornton and Walnut Grove areas are local levees. The Corps has no authority under this investigation to propose reconstruction work beyond the project levees of the Sacramento River Flood Control Project.

The project levees in the Phase IV study area conveyed flood stages in February 1986 at or near the design stages specified for those levees. Even though levee problems were observed in 1986 the project levees performed as Congress envisioned and authorized. These design flood stages are expected to be conveyed through the system and local levees should be designed and constructed to accept those kinds of floodflows.

RESPONSE TO COMMENT 3: During the 1986 flood event, peak flood stages and floodflows were near, at, or exeeded design conditions for most of the study area. Two levee failures, several near levee failures, and numerous levee embankment problem areas, primarily seepage type problems, resulted. Many of these were reconstructed or repaired to insure that the project levees in those locations would safely convey the design flood stages originally authorized and approved by Congress. Reconstruction work proposed under Phases II through V would address those problem areas that have not been repaired to date. Levee work required to repair levee embankments that have deteriorated over time and/or are deficient in order that the project levees will do what Congress initially authorized, are not considered responsible for inducing development. Local entities can make these same repairs under existing maintenance agreeements at any time and, in fact, are urged to do so.

RESPONSE TO COMMENT 4: The Corps of Engineers has given extensive consideration to the use of a system economic approach for our evaluation of the Sacramento River Flood Control Project. The system economic approach would allow us to compare the total cost of reconstruction work needed for the Sacramento River Flood Control Project to the total benefits derived from such work. The original project was authorized and approved by Congress based on the fact that benefits derived exceeded the total cost of flood control features that would be constructed. In addition, development adjacent to project levees and the plan formulation efforts for upstream dams and reservoirs assumed that the entire system would perform as Congress envisioned. Current Corps' policy and guidance however, restrict us to an incremental economic evaluation of separable flood hazard areas. That is, reconstruction work needed for project levees providing flood protection to a separable flood hazard area (Reclamation District 1001 is considered a separable flood hazard area) must be economically justified based on flood damages prevented in that area by such work.

RECLAMATION DISTRICT 999 Clarksburg
Organized 1913

January 23, 1992

US Army
Corps of Engineers
1625 "J" St
Sacramento, CA 95814-2922

Point of Contact for the draft EIR Phase II-V,
Sacramento River Flood Control Study:

On behalf of the people in Reclamation District #999, and the 26,000 acres of land which lie along the North Delta, I am writing to draw attention to several items in the draft EIR of October 1991.

1. Of major concern to many living in the flood plain areas, even areas like Reclamation District #999 which meets the 100 year flood conditions for FEMA, is keeping the Sacramento River ***system*** studied as a ***system*** and have the cost benefit ratios done, not on each phase, but of the entire ***system***, collectively, to determine which, and how much, of the proposed solutions should be undertaken--from doing nothing to the 200 year incident protection including the building of the Auburn Dam.

2. If the cost benefit ratios are done by phases, the high assessed value areas (generally those which are very built up) will "ratio" well, and rural areas will not. Then, those areas that "ratio" well will get the resources and improvements to protect these assets. That makes good sense. This will then make these areas FEMA protected, reopened to development and construction. When this happens, the coefficient of run off will increase accordingly. This extra water will end up in the Sacramento River System and come our way.

3. Therefore, it also makes logical engineering sense, as well as incurring a moral obligation, to protect those areas down stream which will now be under increased pressure to resist flooding. If the Islands of the Delta are left to the local districts to dewater, reclaim and levee maintain, we will not, in most instances, be able to afford the bill and the result will not be a return to a swamp, riparian habitat, but rather a 10' to 30' deep inland sea.

4. The inland flooding would completely disrupt the cross Delta transfer of water to the Clifton Court fore bay and its trip south in the State aqueduct. The result would be an environmental nightmare.

Therefore, I restate that the study must be done on a system wide

38563 Netherlands Road • Clarksburg, California 95612-5003 • 916/775-2144
YOLO COUNTY

basis and the proposed improvements be done on a system wide basis.
5. If fact, it has been stated by engineers that the repairs should start at the West end of the Delta, Collinsville, and work upstream so that the improved areas will be able to better handle the run off rates.

I look forward to hearing from you on this matter and am willing to assist you in any way possible with your study.

Sincerely,

Richard E. Marshall

Richard E. Marshall
District Manager

REM:cg

CC: Cong Fazio
Cong Matsui
The Reclamation Board

RECLAMATION DISTRICT 999

RESPONSE TO COMMENT 1: The Corps of Engineers has given extensive consideration to the use of a system economic approach for our evaluation of the Sacramento River Flood Control Project. The system economic approach would allow us to compare the total cost of reconstruction work needed for the Sacrmento River Flood Control Project to the total benefits derived from such work. Current Corps' policy and guidance however, restrict us to an incremental economic evaluation of separable flood hazard areas. That is, reconstruction work needed for project levees providing flood protection to a separable flood hazard area (Reclamation Districts 999, 307, and 765 are considered a separable flood hazard area) must be economically justified based on flood damages prevented in that area by such work.

Envioronmental documents will consider not only the impacts of potential reconstruction work under the Sacramento River Flood Control System Evaluation but the cumulative impacts associated with other projects under consideration.

RESPONSE TO COMMENT 2: If a Federal interest is determined based on an incremental analysis, Federal funds under the Sacramento River Flood Control System Evaluation would only be made available for the more developed areas. The reconstruction work being proposed is only that work necessary to insure that the levees of the Sacramento River Flood Control Project will perform as Congressional authorized. Work being proposed is not designed to insure that floodflows greater than design conditions can be conveyed safely. The Corps is not authorized under this investigation to provide enhanced levels of flood protection or to insure that the Federal Emergency Management Agency (FEMA) criteria is met.

Significant upstream areas are not now designated by FEMA as flood hazard areas (including Reclamation District 999) and development is taking place and will continue in the future. Any proposal for the discharge of water into the Sacramento River Flood Control Project requires permits through the Corps of Engineers and The Reclamation Board (State of California). Certain conditions can and are being placed on these permits to prevent discharge into the system when flood stages are near, at, or above design stages.

RESPONSE TO COMMENT 3: Local entities are urged to make the necessary repairs to insure that the authorized design flood stages of the Sacramento River Flood Control Project can be conveyed safely. Local entities can make these repairs under existing maintainenace and operation agreements. Local entities can also pursue repairs under the current investigation which is restricted to incremental justification or through other Federal and State programs. In the past, significant Federal funds have been expended in your area of concern to provide bank protection work, for flood fight efforts, and for the repair of flood damaged

levees. These efforts are expected to continue in the future as long as flood control facilities are adequately maintained, to insure that the project levees will perform as Congress envisioned.

RESPONSE TO COMMENT 4: The Congressionally authorized flood control project does not have water supply or environmental restoration as project purposes. The project purpose is flood control and reconstruction work proposed is directed toward that purpose.

Benefits and impacts to water supply and the environment will be considered but only within the design limits of the original project.

RESPONSE TO COMMENT 5: Since public safety is a priority, reconstruction work for Phase I of the Sacramento River Flood Control System Evaluation, the Sacramento Urban Area, was initiated first. As stated above, other means are available for local entities to pursue and Federal funds are available and will continue to be available through other programs.

OFFICE OF
BOARD OF TRUSTEES OF
RECLAMATION DISTRICT No. 1001
1959 CORNELIUS AVENUE
RIO OSO, CALIFORNIA 95674
916 656-2318
916 633-2580

January 16, 1992

District Engineer
U. S. Army Engineer District, Sacramento (Corps)
650 Capitol Mall
Sacramento, California 95814-4794

Re: Comments - Draft Programmatic Environmental Impact Statement/Report

Dear Sir:

1. We concur with the findings of no significant impacts on resources discussed in Section 4.0 of the D.E.I.S., particularly that there will be no significant long-term impacts.

2. The C.O.E. and Reclamation Board should be congratulated on their hard work, patience, perseverance and encouragement of public participation throughout the study area in producing a document which will lay the groundwork for producing an environmentally sound product.

Sincerely,

Donald E. White

DONALD E. WHITE
Secretary/Manager

DEW/dlh

RECLAMATION DISTRICT NO. 1001

RESPONSE TO COMMENT 1: Comment noted.

RESPONSE TO COMMENT 2: Comment noted.

OFFICE OF

BOARD OF TRUSTEES OF

RECLAMATION DISTRICT No. 1001

1959 CORNELIUS AVENUE
RIO OSO, CALIFORNIA 95674
916 656-2318
916 633-2586

January 31, 1992

U. S. Army Corps of Engineers
1625 "J" Street
Sacramento, California 95814-2922

Re: Sacramento River Flood Control Study - Phases II - V

Gentlemen:

Reclamation District 1001 would like to express our views concerning the "phasing" of flood control projects, particularly the cost/benefit ratios used for determining the economic feasibility of such improvements.

For many years now, the engineering associated with releases from the dams, the elevations for bypass flows, design of levee elevations, etc., have been based on effects from the entire system. Businesses have been established, urban areas situated and transportation systems constructed to facilitate the requirements of a rapidly expanding society. These segments all rely heavily on the entire system functioning properly to ensure that raw materials can be received, products shipped and a reasonable measure of health and safety can be enjoyed by the citizenry.

1. We recognize the importance of cost justification for expending tax monies, but would like to suggest that considering the loss of services and damages to transportation systems (i.e.: the State of California in conjunction with Federal Highway Trust Funds recently completed a 17 million plus dollar renovation of Highway 99/70 through this District with a preliminary study already under way for extensive improvements of Highway 70 in the very near future), the potential increased costs for consumers resulting from loss of goods, particularly crops, stored in many of the structures inventoried in your survey, along with the millions of dollars to business people storing equipment, parts, etc., in structures would dictate evaluating cost/benefit ratios to a much broader segment of society.

The Corps of Engineers, State Reclamation Board and varied level agencies deserve a heartfelt thanks for the massive amount of time and effort expended on this project and it is our sincerest hope that, with a little fine tuning, everyone on a local, regional and national level will enjoy the benefits which could result from this multifaceted effort.

Yours truly,

Donald E. White

DONALD E. WHITE
Secretary/Manager

DEW/dlh

RECLAMATION DISTRICT NO. 1001

RESPONSE TO COMMENT 1: The Corps of Engineers performed a detailed inventory of structures and contents in Reclamation District 1001. Various methods, including field surveys and conversations with County assessors were used in determining the value of damageable property in the potential flood plain. In addition, costs were associated with transportation disruptions and physical damage to transportation facilities in the area.

The benefit evaluation indicated that reconstruction work for Reclamation District 1001 was incrementally infeasible and it is doubtful that any refinements of the benefits would change that result. However, the Corps is willing to discuss and review our findings with personnel from your District.

Frank E. Silva
April 27, 1989.

No I.

1. Flood control should be established in the area of origin.
There is No way that we can provide flood safety, since we all live in the flood plane.
Example: Walnut Grove.

No II
2. To provide flood control for the Sacramento area, we must first address the faulty flood control system established in 1903.

A - Remove the weirs that control the flood flow into the Yolo-by-Pass.
B. Use the ship Channel as it is 32 miles in a straight line to the lower end of Grand Island. as opposed to 48 miles down the Sacramento River.
C. The ship channel will be deepened from the present 30-32 ft. to 35 feet This will acommodate more than half of the flow which the Sacramento River can now handle.

3. An environmental control facility should be installed at the Narrowest point between Chipps Island and Pittsburg, Ca. It Should be South & west of the Confluence of the Sacramento and San Joaquin Rivers. This is wher the mixing of the fresh and brackish water is to take place. This facility is also designed to allow anadromous fish to travel back and forth.

The facility will also prohibit the reversal of brackish water into the Tracy Pumping Plants and it will prevent high tidal flows into the Delta during extreme flood conditions

T.E.S

4 Empire Tract	3,400 acres
Termmous Tract	10,500 acres
Staten Island	9,100 acres
New Hope District	9,300 acres
McWilliamson Tract	1,600 acres
Canal Ranch	3,000 acres
Bouldin Island	6,000 acres
	42,900 acres

acres invaded by man.

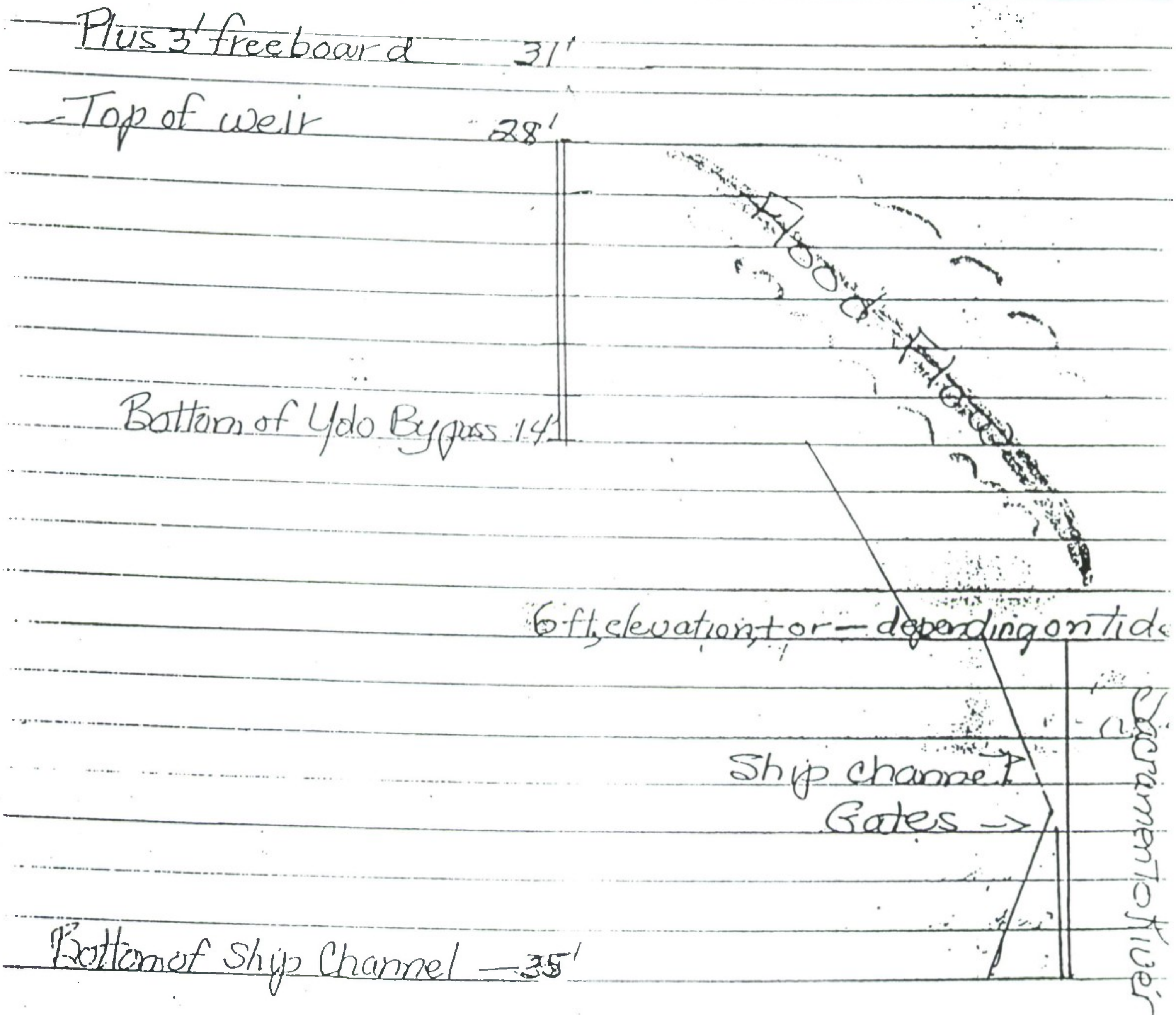
Man living in the flood plane.

This equals about 400,000 acre feet of flood control storage that should be replaced in the area of origin — Namely, the following:

Cosumnes, Dry Creek, Mokelumne Rivers in proportion to their respective size. Furthermore, a flood control dam should immediately, be placed on the Cosumnes River

F.E.S.

Elevation Profile of the Sacramento Weir into the Yolo Bypass at Sacramento, Ca.



F.E.S.

FRANK E. SILVA

RESPONSE TO COMMENT 1: Under the current investigation, Sacramento River Flood Control System Evaluation, the Corps of Engineers has no authority to propose or establish new flood control facilities in the area of origin. The Corps can only propose reconstruction work necessary to correct for design and construction deficiencies inherent in the existing levees and other facilities of the authorized Sacramento River Flood Control Project. The purpose for the reconstruction work, if implemented, would be to insure that the project levees can safely convey the design flood stages originally authorized and approved by Congress. Since the purpose is to restore existing facilities to authorized design levels, flood events greater in magnitude than the design condition can pose a flood threat to the development landward of the levees such as Walnut Grove.

RESPONSE TO COMMENT 2: Under the current investigation, the Corps has no authority to modify the extent, purpose or scope of the original project, the Sacramento River Flood Control Project, initially authorized in 1917. This would preclude removing existing weirs and using the Sacrmento River Deep Water Ship Channel for conveying floodflows.

The Corps did investigate weir modifications (for Sacramento and Fremont Weirs) and use of the Sacramento River Deep Water Ship Channel for conveyance of floodflows under the Sacramento Metropolitan Area investigation (a separate authority from the current investigation). Those alternatives were infeasible and in some cases lacked local support.

RESPONSE TO COMMENT 3: The Corps has no authority to evaluate or implement an environmental control facility under the current investigation.

RESPONSE TO COMMENT 4: The Corps has no authority to evaluate or implement new upstream flood control facilities under the current investigation. However, local entities can request studies of upstream flood control storage facilities through the Corps of Engineers under other programs and authorities.

STATE OF CALIFORNIA

PETE WILSON, Governor

STATE LANDS COMMISSION

LEO T. McCARTHY, Lieutenant Governor
GRAY DAVIS, Controller
THOMAS W. HAYES, Director of Finance

EXECUTIVE OFFICE
1807 - 13th Street
Sacramento, CA 95814

CHARLES WARREN
Executive Officer

January 7, 1992

File: SCH. 90020051

Ms. Carol Whiteside
State Projects Coordinator
The Resources Agency
1416 Ninth Street, Room 449
Sacramento, California 95814

Colonel Laurence R. Sadoff
U.S. Army Corps of Engineers
Sacramento District
1325 J Street
Sacramento, California 95814-2922

Dear Ms. Whiteside and Colonel Sadoff:

Staff of the State Lands Commission has reviewed the Programmatic Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Sacramento River Flood Control System Evaluation, Phases II-V prepared by the U.S. Army Corps of Engineers, Sacramento District (SCH 90020051). Under the California Environmental Quality Act, the Corps is the Lead Agency and the State Lands Commission may be a Responsible Agency and is a Trustee Agency.

By way of general background, upon admission to the Union in 1850, California acquired nearly 4 million acres of sovereign land underlying the State's navigable waterways. Such lands include, but are not limited to, the beds of more than 120 navigable rivers and sloughs, nearly 40 navigable lakes, and the 3 mile wide band of tide and submerged land adjacent to the coast and offshore islands of the State. These lands are managed by the State Lands Commission. The Commission holds its sovereign interests in these lands subject to the Public Trust for commerce, navigation, fisheries, open space, and preservation of natural environments, among others.

The State's sovereign interests within the project area include, but are not limited to, the Sacramento River and its tributaries, the Feather River, the Yuba River, Bear River, Steamboat Slough, Sutter Slough, Cache Slough, and Georgiana Slough.

The Commission has a legal responsibility for, and a strong interest in, protecting the ecological and Public Trust values associated with the State's sovereign lands, including the use of these lands for habitat preservation, open space and recreation. Activities involving these sovereign lands would be subject to the Commission's permitting process; as such, the Commission would be a Responsible Agency under the California Environmental Quality Act (CEQA).

Moreover, the Commission is a Trustee Agency for any and all projects which could directly or indirectly affect sovereign lands and their accompanying Public Trust resources or uses.

1. Preliminarily, it appears that the flood control system alternatives proposed will not involve the State's sovereign interests. However, associated activities related to this work, such as staging areas, may involve the State's sovereign lands and would require a Commission permit. For information concerning the Commission's involvement in this project, please contact Diana Jacobs, Staff Ecologist, at 916-445-5034.

Sincerely,

Sharon Haller

for MARY GRIGGS
Manager
Environmental Review Section

cc: Dwight E. Sanders
OPR
The Reclamation Board

STATE LANDS COMMISSION

RESPONSE TO COMMENT 1: Should future project construction affect the State's sovereign lands, a State Lands Commission permit will be requested.

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Affairs
600 Harrison Street, Suite 515
San Francisco, California 94107-1376

IN REPLY REFER TO

ER 91/1129

Colonel Laurence R. Sadoff
District Engineer
Sacramento District, Corps of Engineers
1325 J Street
Sacramento, California 95814-2922

February 6, 1992

Dear Colonel Sadoff:

The Department of the Interior (Department) has reviewed the Draft Programmatic Environmental Impact Statement/environmental Impact Report for the Sacramento River Flood Control System Evaluation, Phases 11-V (DPEIS). The following comments are provided for your use and consideration when preparing the final documents.

GENERAL COMMENTS

1. The U.S. Fish and Wildlife Service (FWS) has concerns regarding mitigation of project impacts on fish and wildlife resources. Mitigation of environmental impacts should be analyzed as part of the alternatives. The purpose of mitigation, whether it be in the form of an alternative or an action within an alternative, is to avoid, minimize or eliminate impacts to some degree on affected resources.

2. The DPEIS states that any adverse environmental effects that could not be avoided would be mitigated to less-than-significant levels. However, there are no specific details on how this would be accomplished, and the FWS recommends that details of plantings monitoring, effectiveness, and other mitigation features be provided . Furthermore, the DEIS states waterside contruction would be avoided: this is vital for preventing or minimizing possible adverse impacts to fish and wildlife.

3. However, if future construction would occur on the waterside of the levee, the mitigation measures which would be committed should be addressed in the DPEIS. Mitigation measures should be presented in the document as options that would be committed to when specific impacts are identified.

4. In addition, the FWS also has concerns regarding cumulative impacts. The DPEIS states that there woudl be no further cumulative impact from the project; yet, the project in terms of impacts to fish and wildlife is largely undefined. This, coupled with past mitigation efforts that have been unsuccessful, and past desagreement between the FWS and the Corps of Engineers (CE)

on the amount of mitigation required, indicates that there may be additional cumulative impacts.

5. The FWS Mitigation Policy (Federal Register 46:15, January 23, 1981) provides goals and guidelines for Service recommendations on mitigation of project impacts. Four Resource Categories are used to indicate that the level of mitigation recommended would be consistent with the fish and wildlife resource values involved. These categories are determined by the value of the affected habitats for selected evaluation species and by the scarceness and/or uniqueness of the habitat. Each resource Category has an associated mitigation planning goal, and a brief description of each Resource Category is provided Appendix A.

The habitats in the project area and their associated Resource Category determinations and mitigation goals were addressed in the Sevice's Planning Aid Letters provided to the Sacramento District on each phase of the project.

In additon, Region 1 of the FWS (whose jurisdiction includes California) has established a mitigation policy of no net loss of habitat value or acreage wetland impacts. Thus, the FWS mitigation recommendations on all wetland impacts call for a minimum of no loss of habitat value or acreage.

Specific Comments

Page DEIS 1, 1.0 Project Description, paragraph 1. The project description should include statements on the authorized level of flood protection and the current level of protection being provided by the project and how this current level was determined.

Page DEIS 20, 5.2 Wildlife, paragraph 1. The common name for whistling swan has been changed to tundra swan. Dark goose and white goose are names typically used in bird censusing when species identification cannot be determined. Typically, in the Central Valley, a dark goose may be one of the two subspecies of greater white-fronted goose, or any of several subspecies of Canada goose. White goose refers to either a snow goose or a Ross' goose. Shorebirds are generally members of the Families Recurvirostridae, Charadriidae, and Scolopacidae. Great blue heron and great egret are wading birds (Family Ardeidae)

Page DEIS 20, 5.2 Wildlife, paragraph 3. The common name for marsh hawk has been changed to northern harrier. Burrowing owl populations have decreased largely as a result of conversion of open lands to agricultural and urban uses. Barn and short-eared owls are more commonly observed than burrowing owls. Also, many owl species nest on the ground rather than in trees as indicated in the first sentence.

Page DEIS 20, Section 5.2.2 Impacts. The FWS recommends that the sentence under No Action be changed to: Periodic maintenance

practices for the project levee embankments would continue. Therefore, there would be no additional impacts to fish and wildlife.

Page DEIS 21, 5.2.2 Impacts, Line 3. Delete types."

Page DEIS 21, 5.2.2 Impacts, paragraph 2, last sentence. The FWS believes that adjacent habitats are at carrying capacity and species forced into adjacent areas for any length of time would be lost.

Page DEIS 22, Section 5.2.3 Mitigation. The FWS recommends deletion of "vegetative" in the first sentence and changing the third and fourth sentences to: The impacts would be mitigated by avoidance, minimizing, rectifying, reducing and compensating measures. Rectifying measures would include activities such as regrading and seeding disturbed areas while compensating measures would include creation of new habitat to replace the acreage and values lost.

Page DEIS 22, Section 5.3.1, first paragraph, second sentance. Anadromous fish use the river for adult migration to the spawning areas and juvenile out-migration.

Page DEIS 22, Section 5.3.1, paragraph 2. This paragraph should be changed to clarify that four distinct races of chinook salmon presently use the river and tributaries. They are fall-, late fall-, winter-, and spring-run.

Page DEIS 22, last paragraph. The first sentence should be deleted and replaced with: There has been an overall decline in steelhead and all races of chinook salmon in the upper Sacramento River System. The following sentence should be added to the end of the paragraph: In the upper Sacramento is occurring primarily among the numbers of salmon that spawn naturally above Red Bluff, not hatchery fish. In the lower Sacramento River system (Yuba, Feather and American Rivers) populations have remained more stable.

Page DEIS 23, Section 5.3.2 Impacts, second paragraph. The FWS suggests changing the third sentence to: "Fish in the existing canals and ditches would be negatively impacted..." This would be consistent with other sections of the DEIS (example on page 23).

Page DEIS 24, Raise Levees, continjuing paragraph, line 6. Impacts to shaded riverine aquatic and riparine habitats can be minimized to some extent if vegetation is allowed to grow back in areas where it is removed.

Page DEIS 24, Construct a Cutoff Wall, second full paragraph. The last sentence is true, provided there are no spills of slurry into these canals and ditches. We recommend that the first and last sentence of the paragraph be combined.

Page DEIS 24, Section 5.3.3 Mitigation. The FWS recommends changing the second paragraph to: Shaded riverine aquatic impacts will be avoided or reduced as much as possible. Areas afected by construction would be revegetated with native species. During site specific impact analysis, distinctions between woody riparian and shaded riverine aquatic habitats would have to be made to avoid "double" impacts identifications.

Page DEIS 36, Section 10.3.1. Sacramento Bank Protection Project. The description of the First Phase should be clarified. The project as originally authorized had no provisions for mitigation. As a result of comments from the public, FWS, and California Department of Fish and Game comments, the CE funded the FWS to review the impacts of Phase 1 and prepare a mitigation plan. This was completed in 1976, and a recommendation for acquisition and revegetation of 668 acres of riparian lands was made.

The CE disagreed with the findings and took the position that only 260 acres were justified for mitigation and the additional 408 acres, if acquired, should be enhancement. The controversy continued for approximately 13 years when Congress finally settled the issue by authorizing and funding First Phase mitigation for 260 acres. The CE supports the acquisition of the additional 408 acres but not as mitigation, and is actively seeking means to acaquire the authority and funding to proceed with acquisition of additional lands.

Regarding the Second Phase, the source of the figure for the 700 acres of mitigation needs to be identified. The FWS is unaware of the existence of any summary of mitigation for the various contracts. Furthermore, two preliminary studies conducted by FWS found that the mitigation provided to date for the Second Phase has been ineffective for a variety of reason as identified in their reports.

Page DEIS 37, Section 10.4.3 American River Watershed Investigation. The latest information received by the FWS indicated 209 acres of grassland and agricultural lands would be lost with the project. In the Fish and Wildlife Coordination Act (FWCA) report, the FWS identified the need for off-site mitigation on the South Fork American River and that there were no suitable mitigation lands in the project area.

Page DEIS 38, Seciton 10.4.4 Sacramento Metropolitan Area Project. The acreage identified in this section to "fully mitigate" impacts of the project is for less that what FWS identified. While the FWS has assisted in planning the revegation plan of the 52.5 acre CEf mitigation site, the FWS does not concur that the mitigation site is adequete to offset impacts of the project.

Page DEIS 39, Section 10.4.8 Yolo Basin Wetlands Project. There

have been significant cumulative impacts to wetlands in the region. In some projects there simply was no mitigation or it was less that needed, and it other projects the mitigation efforts have been ineffective. All adverse impacts to wetlands (including riparian lands) that cannot be avoided should be mitigated to the extent that there is no net loss of habitat value or acreage. A commitment to full mitigation of all poject impacts of Phases II - V would ensure no further cumulative impacts to the region.

Page DEIS 40, number 2. The CE does not prepare FWCA reports, but coordinates with the FWS, California Department of Fish and Game, and National Marine Fisheries Service (NMFS). Under the FWCA, "consultation" is mandatory. Because the NMFS was part of the FWS when the FWCA was approved by Congress, the NMFS may also prepare FWCA reports.

Summary Comments.

Construction of the project will adversely impact wildlife resources by disturbing their habitat. There will be fishery impacts if canals and ditches are relocated, or if there is waterside construction on the levees. However, specific impacts will not be identified until each phase is worked on. The timing of work for each phase needs to be presented as well as more complete information on mitigation options, including implementation and monitoring considerations.

We appreciate this opportunity to comment.

Sincerely,

William ...

Patricia Sanderson Port
Regional Environmental Officer

cc: Director, OEA (w/incoming material)
Regional Director, FWS, Portland, OR
FWS, FWE, Sacramento, CA
Regional Director, BR, Sacramento, CA

Appendix A

When impacted habitat has high value for evaluation species and is unique and irreplaceable on a national basis or in the ecoregion (Resource Category 1), the mitigation goal calls for no loss of existing habitat value. If the habitat to be impacted has high value for evaluation species and is relatively scarce or becoming scarce on a national basis or in the ecoregion (Resource Category 2), the mitigation goal is no net loss of in-kind habitat value. For impacted habitats which have high to medium value for evaluation species and are relatively abundant on national basis (Resource Category 3), the mitigation goal is no net loss of habitat value while minimizing loss of in kind habitat value. Lastly, if the habitat to be impacted is of medium to low value for evaluation species (Resource Category 4), the mitigation goal is to minimize loss of habitat value.

UNITED STATES DEPARTMENT OF THE INTERIOR
OFFICE OF THE SECRETARY

RESPONSE TO COMMENT 1: The draft Programmatic EIS has addressed mitigation in general terms. It is the intention of each individual EA/EIS for each phase of the project to evaluate impacts for specific sites and, if necessary, prescribe the appropriate mitigation measures necessary to alleviate impacts. It is also the intention of each individual phase of the project to avoid project impacts, wherever possible.

RESPONSE TO COMMENT 2: No specific details for mitigation have been provided because no specific work sites have been identified in the DPEIS. Specific work sites will be identified in the EA/EIS for the individual phases of the project. Once specific worksites have been identified, specific details on mitigating adverse environmental effects to less-than-significant levels can be developed.

RESPONSE TO COMMENT 3: Waterside construction sites will be avoided wherever possible. Also, please see response to comment 2.

RESPONSE TO COMMENT 4: The Corps does not anticipate any unmitigatable cumulative impacts at this point. When an EA/EIS is prepared for each phase of the project, and specific work sites are determined, cumulative impacts will be considered once again. At that point, once specific sites are known, it will be easier to assess cumulative impacts, if there are any.

RESPONSE TO COMMENT 5: Comment noted.

Specific Comments:

<u>Page 1, 1.0, paragraph 1:</u> Additional discussion concerning the authorized level of flood protection, the current level of protection provided by the project and the methodology for this determination has been added to the text.

<u>Page 20, 5.2, paragraph 1:</u> Text has been changed to reflect the comment given.

<u>Page 20, 5.2, paragraph 3:</u> Text has been changed to reflect the comment given.

<u>Page 20, 5.2.2:</u> Text has been changed to reflect the comment given.

<u>Page 21, 5.2.2, line 3:</u> Text line 3, has been changed to reflect the comment given.

<u>Page 21, 5.2.2, paragraph 2, last sentence:</u> Text has been changed to reflect the comment given.

Page 22, 5.2.3: Text has been changed to reflect the comment given.

Page 22, 5.3.1, paragraph 1: Text has been changed to reflect the comment given.

Page 22, 5.3.1, paragraph 2: Text has been changed to reflect the comment given.

Page 22, last paragraph: Text has been changed to reflect the comment given.

Page 23, 5.3.2, paragraph 2: Text has been changed to reflect the comment given.

Page 24, Raise levees, line 6: Text has been changed to reflect the comment given.

Page 24, Cutoff wall, paragraph 2: Comment noted.

Page 24, 5.3.3, Mitigation: Text has been changed to reflect the comment given.

Page 36, 10.3.1, Sacramento Bank Protection Project: Text has been changed to reflect the comment given. The source used was:

U. S. Fish and Wildlife Service, Region One. 1992. Progress of Problem Resolution for Mitigation Measures, Sacramento River Bank Protection Project, Second Phase. USDI, Fish and Wildlife Service, Sacramento, California.

Page 37, 10.4.3, American River Watershed Investigation: Text has been changed to reflect the comment given. Both FWS and the CE agree that impacts in the Natomas area will be mitigated in the Natomas project area. Impacts in the upper American River may be mitigated for in the South Fork American River area.

Page 38, 10.4.4, Sacramento Metropolitan Area Project: Comment noted.

Page 39, 10.4.8, Yolo Basin Wetlands Project: Comment noted. The CE concurs that adverse impacts to wetlands that cannot be avoided should be mitigated to the extent that there is no net loss in wetlands. The CE is committed to fully mitigate all project impacts for phases II - V.

Page 40, number 2: Text has been changed to reflect the comment given.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, Ca. 94105

January 17, 1992

Colonel Laurence R. Sadoff
District Engineer
ATTN: CESPK-PD-B
U.S. Army Corps of Engineers
Sacramento District
1325 J Street
Sacramento, California 95814-2922

Dear Colonel Sadoff:

The Environmental Protection Agency (EPA) has reviewed the Draft Programmatic Environmental Impact Statement/Environmental Impact Report for the project entitled **Sacramento River Flood Control System Evaluation, Phases II-V, California.** Our review is provided pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508) and Section 309 of the Clean Air Act.

In response to the 1986 flood event which severely stressed the existing levee system, the Corps of Engineers (COE) proposes to evaluate the integrity of the Sacramento River Flood Control Project levees and to restore these levees to their Congressionally authorized levee design. The project area includes the Sacramento River and tributaries from Red Bluff to Collinsville and has been divided into five phases:

Phase I - Sacramento Urban Area. Levees in the Sacramento urban area. Reconstruction of these levees will be completed in 1992.

Phase II - Marysville/Yuba City Area. Levees along the Feather and Yuba Rivers. Release of a site-specific DEIS is scheduled for 1992.

Phase III - Mid-Valley Area. Levees along the Sacramento River and Yolo Bypass in Sutter, Yuba, Placer, Yolo and Solano Counties.

Phase IV - Lower Sacramento Area. Levees along the Sacramento River and Delta sloughs in Sacramento, San Joaquin, Yolo, Solano and Contra Costa Counties. All project levees in the Delta are considered in this phase.

Phase V - Upper Sacramento Area. Levees along the Sacramento River in Colusa, Butte, Glenn and Tehama Counties.

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Alternatives evaluated include no-action, drainage improvements, raising levees, stabilizing berms, and cutoff walls. Although preferred alternatives will not be selected until specific work sites have been determined, the COE has indicated their intent to work primarily on the crown or landward side of the levees (pg. 8). Detailed analyses will be performed for each phase and presented in an EA/FONSI available for public review and comment. If potential impacts are significantly different than reported in the programmatic EIS, a supplemental EIS will be prepared.

Other related projects in the Sacramento River system include: Sacramento Metropolitan Area (levee improvements); American River Watershed Investigation (long-term flood protection, upstream flood control-only dam); Folsom Dam and Reservoir Reoperation (temporary flood protection); Westside Yolo Bypass Levee Reconnaissance Study; Cache Creek Settling Basin Project; Yolo Basin Wetlands Project; Bureau of Reclamation's multipurpose Auburn Dam (water supply); and Bureau of Land Management American River National Recreation Area Study. All of the above projects assume completion of levee repairs as proposed in this Sacramento River Flood Control System Evaluation project.

EPA recognizes the critical need for long-term flood protection along the Sacramento River and tributaries. We support the protection of existing property and structures from flood damage and believe that protection method(s) should be selected which will, with mitigation for unavoidable impacts, also minimize damage to the natural environment.

We commend the COE's emphasis on minimizing potential
impacts to riparian and wetland habitat by working primarily on
1. the crown and landward side of the levees. We suggest the COE
also evaluate the feasibility of non-structural or composite
(structural/non-structural) alternatives where existing property,
2. structures and lives are not at risk. We note that much of the
project area is rural and suggest that fish and wildlife habitat
enhancement opportunities may be available. Furthermore, we urge
3. the COE to seriously consider supplemental EISs for site-specific
environmental documentation versus EA/FONSIs due to the large
scale of proposed work. For instance, 82 miles of levee repairs
are proposed for Phase III, Mid-Valley Area (Appendix D: U.S.
Fish and Wildlife Service, August 9, 1990 Phase III Planning Aid
Letter to COE).

4. EPA also has concerns with potential impacts to water quality, hydrology, air quality and noise. We are especially concerned with the implication that air quality, water quality and noise are not likely to be adversely impacted during the project (pgs. 9-12) and are therefore minimally addressed in this programmatic document. We believe potential impacts to these resources may be greater than anticipated given the large scope of proposed work and potential cumulative impacts. We urge the

COE to provide detailed evaluation of potential impacts to these resources in site-specific environmental documentation.

Based upon the above concerns, we have classified this DEIS as category EC-2, Environmental Concerns - Insufficient Information (see attached "Summary of the EPA Rating System"). Our detailed comments are enclosed.

We appreciate the opportunity to review this Programmatic DEIS. Please send three copies of the Final Programmatic EIS to this office at the same time it is officially filed with our Washington, D.C. office. If you have any questions, please call Jacqueline Wyland, Chief, Office of Federal Activities, (415) 744-1584, (FTS 484-1584) or Laura Fujii, of her staff, at (415) 744-1579, (FTS 484-1579).

Sincerely,

Jacqueline Wyland

for Deanna Wieman, Director
Office of External Affairs

Enclosure: (4 pages)

Filename: SYSEVAL.LTR
91-327
MI000317

cc: COE, Sacramento, Walter Yep
COE, San Francisco, Frank Dunn
FWS, Sacramento, Wayne White
NMFS, Santa Rosa, James Bybee
CA Reclamation Board, Wallace McCormack
CDFG, Region 2, Jim Messersmith
SWRCB, Sacramento, Donald Maughan
RWQCB, Region 5, William Crooks
ARB, Jim Boyd
SCAPCD, Sacramento
SACOG, James Williams
SAFCA, Bill Edgar
HQ EPA: OFA, OWOW

COMMENTS

National Environmental Policy Act Comments

1. We recommend that the Corps evaluate alternatives for improving flood protection besides levee repair alone. Without doing so, it appears that the DEIS does not "rigorously explore and objectively evaluate all alternatives " as required by NEPA (40 CFR section 1502.14(a)). For instance, the DEIS does not address or evaluate whether non-levee (e.g., flood easements, floodwalls, flood proofing) or composite (structural/non-structural) alternatives are feasible to provide the Congressionally authorized flood protection. Nor does the DEIS provide justification for elimination of these alternatives from further consideration. We recommend the final programmatic EIS address the feasibility of such alternatives. Site-specific environmental documentation should in more detail evaluate all reasonable alternatives for providing the Congressionally authorized flood protection at each site.

2. The programmatic DEIS provides only minimal evaluation of potential impacts to water quality, hydrology, air quality and noise. Site-specific environmental documentation should include detailed evaluation of potential impacts to these resources and describe mitigation measures for these impacts. The assumption of minimal impacts to these resources may not always be valid. For example, construction activities could adversely impact air quality in areas with existing PM10 problems. Furthermore, short-term temporary impacts do not guarantee lack of adverse impact to the environment.

Section 404 Comments

Alternatives Analysis and Practicability

3. Although specific work sites, discharge sites, and selected alternatives are unknown, the programmatic DEIS states that the proposed discharge site is the least environmentally damaging practicable alternative (Appendix A: 404(b)(1) Water Quality Evaluation, Section III, Factual Determinations, pg. 7). We believe that such a determination cannot be made until after site-specific environmental and alternative analyses have been completed. We note that, of the alternatives proposed, Alternative D Cutoff Wall appears to be the least environmentally damaging alternative since impacts to wetlands and waters of the United States are not proposed.

Water Quality and Endangered Species

4. To comply with the 404(b)(1) Guidelines, the proposed project must not violate water quality standards, toxic effluent standards, or jeopardize the continued existence of federally listed species or their critical habitat (40 CFR 230.10(b)). The proposed project may result in adverse impacts to federal and state threatened and endangered species such as the valley elderberry longhorn beetle and Swainson's hawk. In addition, the giant garter snake, a state listed, federal candidate species, may be affected by alteration and relocation of irrigation ditches and associated wetlands. We recommend close coordination with the US Fish and Wildlife Service (USFWS) and California Department of Fish and Game be continued to ensure the valley elderberry longhorn beetle, giant garter snake, and Swainson's hawk are not jeopardized by the proposed project and that potential impacts to sensitive species are minimized.

5. Significant disparities exist between U.S Fish and Wildlife Service (USFWS) and Corps of Engineers environmental impact analyses for other Sacramento River flood control projects. We recommend the COE and USFWS coordinate early on each project phase to resolve any disagreements regarding assumptions used to determine potential impacts and mitigation for the proposed work. Should the agencies be unable to fully agree on these issues, the site-specific environmental documentation should fully disclose the unresolved differences and assumptions of the analyses.

Significant Degradation

6. The final programmatic EIS should provide a description of the areas receiving flood protection and include FEMA 100-year flood plain maps. In addition, site-specific environmental documentation should include a detailed delineation of waters of the United States, including wetlands. Non-wetland riparian habitat should be identified and a table listing affected habitat types provided.

Mitigation

7. We wish to emphasize that all appropriate and practicable steps should be taken to minimize adverse impacts on the aquatic ecosystem (40 CFR 230.10(d)). Avoidance and minimization of the potential impact should be the priority with compensation and mitigation considered only for unavoidable impacts. Furthermore, we urge the COE to seriously consider the recommendations and mitigation measures proposed by the USFWS in their Planning Aid letters for Phases III-V (Appendix D).

General Comments

8. Appendix A 404(b)(1) Water Quality Evaluation appears to focus on the fill of irrigation ditches and does not fully address potential impacts from possible work on the waterside of levees or in borrow, staging and disposal areas. For instance, the evaluation states that the discharge would not divert or obstruct flow or destroy or isolate flood plain areas (pg. 5). Although work is proposed primarily for the crown and landside of the levees, work on the waterside has not been conclusively eliminated as an option (pg. 8). If work on the waterside is carried out, impacts to circulation, water fluctuations, and flood plains could occur. Furthermore, levee reconstruction could affect water sources (e.g., seepage) to existing wetlands and increase downstream flood stages. We recommend the site-specific 404(b)(1) water quality evaluation and environmental documentation fully address all proposed fill sites and potential impacts to waters of the United States and their associated wetlands.

Specific Comments

1. 1. Page 2. Federal Requirements. The description of specific laws should be expanded to clearly show their scope. For instance, the Clean Air Act includes specific air quality planning requirements, while the Clean Water Act also mandates compliance with specific water quality standards and maintenance of beneficial uses.

2. 2. When references to previous documents are used, the EIS should provide a summary of critical issues, assumptions and decisions complete enough to stand alone without depending upon continued referencing of other documents.

SUMMARY OF RATING DEFINITIONS
AND FOLLOW-UP ACTION*

Environmental Impact of the Action

LO--Lack of Objections
The EPA review has not identified any potential environmental impacts requiring substantive changes to tha proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changas to tha proposal.

EC--Environmental Concerns
The EPA raview has identified anvironmental impacts that should be avoided in order to fully protect the environment. Correctiva measures may rsquire changes to the praferrad altarnativa or application of mitigation measures that can reduce tha environmental impact. EPA would lika to work with the lead agency to reduce these impacts.

EO--Environmental Objections
The EPA review has identified significant environmental impacts that must be avoided in ordar to provida adequata protection for the environment. Correctiva measures may require substantial changas to the preferred altarna tive or consideration of some other project alternativa (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU--Environmentally Unsatisfactory
The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to tha CEQ.

Adequacy of the Impact Statement

Category 1--Adequate
EPA believes the draft EIS adequataly sets forth tha anvironmental impact(s) of the preferred alternative and thosa of the alternatives reasonably avail able to the project or action. No furthar analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2--Insufficient Information
The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoidad in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduca the environmental impacts of the action. The identifiad additional information, data, analyses, or discussion should be included in the final EIS.

Category 3--Inadequate
EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of tha NEPA and/or Section 309 review, and thus should be formally ravised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to tha CEQ.

*From EPA Manual 1640 Policy and Procedures for tha Review of Federal Actions Impacting the Environment.

Figure 4-1

ENVIRONMENTAL PROTECTION AGENCY

RESPONSE TO COMMENT 1: Under the current investigation, Sacramento River Flood Control System Evaluation, the Corps of Engineers has only the authority to consider design and construction deficiencies inherent in the existing and Congressionally authorized project facilities of the Sacramento River Flood Control Project. The Corps has no authority under this study to modify the extent, scope or purpose of the existing project facilities. This authority precludes consideration of new levees, raising levees above previous Congressionally approved heights, new flood control plans different than the existing Project, and non-structural alternatives. In general, if there is a Federal interest, the Corps could repair project facilities, particularly levee embankments, that have deteriorated over time or that can potentially deteriorate during flood stages equal to or less than the design conditions originally approved by Congress.

RESPONSE TO COMMENT 2: Fish and wildlife enhancement opportunities may be available in the Marysville/Yuba City Area. Congress has authorized the Corps to participate in environmental enhancement/restoration projects associated with flood control projects. However, there must be a non-Federal sponsor that can provide 25 percent of the cost, including lands, and all operation and maintenance activities.

RESPONSE TO COMMENT 3: When contracting with FWS for a Planning Aid Letter on Phase III, Mid-Valley Area, of this evaluation, the Corps proposed a worst-case scenario for levee repairs. The structural integrity of all the project levees within this area was investigated. Preliminary study results indicate about 20 miles of levee reconstruction are required to restore the Congressionally authorized level of flood protection for the Mid-Valley Area. In addition, based on current Corps policy on incremental economic justification, there would only be a Federal interest in pursuing about 10 miles of levee reconstruction work.

RESPONSE TO COMMENT 4: No specific worksites have been identified in this PEIS. Specific sites will be identified for the project in the individual EA's for each phase. Once these specific worksites are identified, site-specific environmental documentation can be completed. Until then, it will be difficult to address potential impacts in site-specific detail. These specific impacts will be addressed in the individual EA's for each phase.

<u>Attached General Comments</u>

<u>National Environmental Policy Act</u>

RESPONSE TO COMMENT 1: Please see response to Comment 1, above.

RESPONSE TO COMMENT 2: No specific details have been provided for project impacts because no specific work sites have been identified in the DPEIS. Specific work sites will be identified in the EA/EIS

for the individual phases of the project. Once specific worksites have been identified, specific project impacts on resources can be evaluated and details on mitigating adverse environmental effects to less-than-significant levels can be developed.

Section 404 Comments

RESPONSE TO COMMENT 3: The Corps concurs with this comment. A detailed section 404 analysis will be conducted for each phase of this project.

RESPONSE TO COMMENT 4: The Coprs concurs with this comment. Close coordination will be maintained with FWS to ensure that threatened and endangered species are not jeopardized by the proposed project and that all Endangered Species laws complied with for each phase of the project.

RESPONSE TO COMMENT 5: The Corps concurs with this comment.

RESPONSE TO COMMENT 6: Under existing operation and maintenance agreements for the Congressionally authorized Sacramento River Flood Control Project, local entities can and are urged to make their own repairs to project levees to ensure that these levees can safely convey the approved design flood stages. In many cases where the local entities have had the financial resources, they have made their own repairs. In other cases, because of the potential financial burden, Federal assistance has been requested through the Corps.

In addition, under the current study authority, the Corps is unable to provide enhanced levels of flood protection. The Corps has no authority to recommend levee reconstruction work over and above that which the local entities could implement on their own under existing operation and maintenance agreements. Any reconstruction work proposed by the Corps will only insure that existing flood protection provided will meet the previous Congressionally approved levels. Therefore, the areas receiving flood protection will be no different than originally intended for this project when it was authorized in 1917.

The Corps will stipulate a level of flood protection associated with the design water surface according to Corps criteria. The Corps has no authority or funding to determine an equivalent FEMA (Federal Emergency Management Agency) level of flood protection for those design conditions. Since FEMA and Corps criteria are different, the levels of flood protection would be different at the project design water surface. Since the Corps is not providing enhanced levels of flood protection, FEMA flood plain maps approved for the study area are available through that agency and will not be incorporated in our studies.

RESPONSE TO COMMENT 7: The Corps concurs with this comment.

RESPONSE TO COMMENT 8: The Corps concurs with this comment.

<u>Specific Comments</u>

1: Comment noted.

2: Text has been changed to reflect the comment given.

USDA SOIL CONSERVATION SERVICE
1345 MAIN STREET
RED BLUFF, CALIF. 96080

1/21/92

TO: U.S. Army Corp of Engineers
Sacramento District
ATTN: CESPK-PD-R
1325 J Street
Sacramento, Calif. 95814-2922

Subject: DEIR/R Sacto Flood Control

I have reviewed your Draft Sacramento River Flood System Evaluation, Phases II-V - Programmatic Impact Statement/Enviormental Impact Report.

1. I feel that you have made a very complete study and you understand the problems and concerns that you face when you want to do works of construction along riparian corridors.

You have carefully worded the words "that the system does not meet the conditions approved by Congress". (Pages DESI-1 DESI-4, DESI-6, DESI-8, and DESI-34.) These conditions authorized by Congress are the flood levels or capacity of the levee system as originally constructed to carry a 200 yr storm event. Through time man encroached the levees in the former rural areas with urban sprawl. The report stated that the system has a capacity for a 100 year event.

2. Your concerns are correct. In the alternatives one important alternative was overlooked. The levee system as designed has forced the sediments to remain within the stream corridor. Historically, floods spread the sediments throughout the valley or floodplains. The reaches of the river with a low energy gradient drop sediments and the system agrades. The report does not address aggradation or degradation of the river system. The reduced capacity of the levee system is due in part to aggradation and therefore has a reduced flood protection level required by Congress. This is further impacted by the fact that flood insurance cannot be purchased and there is a liability that the government does not want.

Of the alternatives studied, dredging was not mentioned and it is the main factor which reduces the capacity of "congressional authorized design level of flood protection."

3. The other alternatives suggested do impact the enviorment too. Raising levees requires more land being covered by fill. Drainage improvements should be a part of on going maintenance. A cutoff trench 20 to 30 feet deep is almost impossible to construct. And a stabilizing berm does not add to increased flood protection.

4. With all concerns, an increased program of maintenance with the existing levees is the alternative you may have to go with. The existing program of bank protection should continue. More important is the need to coordinate and be consistent with the Upper Sacramento River Plan.

Thank-you for letting me comment on your report.

Linden Brooks for
Area Conservationist
1345 Main St.
Red Bluff, Ca. 96080

Capital flood plan riddled with controversy

Second of two parts

By Jim Mayer
Bee Staff Writer

Sacramento's flood-control officials always said getting federal money to bolster the capital's defenses would be a big job. It turns out they underestimated the task.

After five years and more than $10 million worth of studies, a flood-control proposal is headed to Washington, D.C., with several major controversies and smaller disputes left unresolved. Officials say a couple of them may be deal-breakers.

The deal is of significant consequence to Sacramento, which now is protected by a moratorium from federal flood insurance regulations. Unless Congress acts this year to bar enforcement of the Federal Emergency Management Agency's rules, the moratorium will expire this autumn, all construction will come to a halt in most of the city and county, and homeowners' flood insurance premiums in low-lying areas will begin to climb dramatically.

Some of the disagreements are unique to plans for a massive Auburn Dam proposed for the north fork of the American River – such as whether 5,000 or 50,000 acres must be preserved to make up for environmental damage, which, if nothing else, could add more than $100 million to the price tag.

But proposals for the dam, and levee repairs intended to triple the city's flood protection, also have raised national policy questions of the kind usually debated for years and settled after still more studies. For instance, should the dam be sized to provide the maximum economic benefit or the least environmental damage?

All of these amount to huge boulders in the path of a project that officials say must fly through an accelerated approval process. If the narrow window of opportunity to get federal funding slams shut, federal regulations will thwart building in much the same way they have in Natomas.

"The schedule is just extremely ambitious," said Sacramento County

The persistent controversies also could force Sacramento to settle for a plan that offers far less flood protection than officials say is needed, one that meets minimum requirements but not what the controversial dam would provide, an alternative they only now are beginning to publicly acknowledge.

"You get as much flood protection as you can, and gradually and incrementally get more," said local flood chief Bill Edgar. "But now it is up to us to recommend what we honestly believe is the correct thing to do."

That recommendation is embodied in a report completed last month by the U.S. Army Corps of Engineers. It will be made public next month.

The plan contains few surprises. The corps is recommending major levee repairs and a 434-foot-tall concrete dam near Auburn that would hold water only when the river rises dangerously high.

Combined, the project would protect all of the city and much of the county from a storm expected once every 200 years – twice the federally required protection of 100 years.

Before the widespread floods of 1986, engineers thought the existing system of levees, Folsom Dam and other dams provided about 125-year protection. That near-disaster convinced federal engineers the system provided half as much assurance.

The new project would cost about $700 million, much of that total paid by the federal government, along with some by the state and local property assessments.

Federal money is crucial to the project, and to smooth its passage through Congress, officials have struggled over the years to quiet disputes between government agencies and public interest groups.

At least three large issues remain between the corps and the U.S. Environmental Protection Agency:

■ In selecting the dam, the corps used guidelines intended to provide the biggest bang for the buck. Those rules led engineers to a huge dam that would protect against a 400-year flood, which was scaled back when local agencies wanted no more than the 200-year dam

'You get as much flood protection as you can, and gradually and incrementally get more.'
– Bill Edgar

sue the "least damaging practical alternative." Jacqueline Wyland, the EPA's federal activities chief in San Francisco, said the corps analysis only considered environmental damage after the fact.

■ To improve flood control while the dam is being built, the corps has proposed lowering the Folsom Lake water level each winter to save more room for floodwater. The corps' environmental study on that plan has been delayed, and the EPA maintains it must be done to properly analyze the overall project.

■ And finally, the corps is making such significant revisions to its draft environmental studies that the EPA believes the document must be released again for public comment. Corps and local officials say the extra review would delay the project past this summer's congressional window of opportunity to authorize the dam.

"EPA is not against Auburn Dam or flood protection," Wyland said. "We just believe that one needs to be careful that the means of providing flood protection are also sensitive to the environment. It also is important to ensure the best decision is made prior to construction."

Edgar, executive director of the Sacramento Area Flood Control Agency, considers these three disputes "mega-issues," particularly the application of the Clean Water Act.

The U.S. Fish and Wildlife Service also is concerned that other federal policies dictate a smaller project and that the corps will not do enough to compensate for the project's environmental damage.

Wildlife service officials maintain that a presidential order discourages the corps from damaging wetlands, such as the river canyon that would be dammed. Another order discourages development in flood plains, which would occur in largely agricultural Natomas once levees are repaired.

Service officials believe 52,000 acres along the American River's south fork must be purchased and restored to make up for the damage caused by periodic inundation of 34 miles of the north and middle forks.

The service also recommends that 17,650 acres in Natomas be set aside as agricultural and nature preserves to make up for the 22,700 acres of urban growth that will occur in the balance of the basin.

Edgar believes the wildlife service overstates the need for compensation in the canyons. For Natomas, Edgar said, SAFCA will propose next month a "very aggressive and very environmentally sensitive plan."

In addition to consensus among government agencies, local officials also had hoped to forge a compromise among community groups in what always has been a polarized debate. On one side are environmentalists who want to protect the canyons and provide minimal flood protection with levee fixes.

On the other are proponents of a multipurpose dam who have hoped the flood concerns would kick-start the Auburn Dam project, which was abandoned by the U.S. Bureau of Reclamation.

The threat of a building moratorium encouraged many of the Sacramento development interests to settle for flood protection now. The Sacramento Metropolitan Water Authority, a partnership of water districts supportive of a multipurpose dam, also has opted to support the flood-control dam in the hope it will be expanded later.

But the foothill-based Auburn Dam Council is still adamantly opposed to a flood-control dam, wanting instead a big dam. Said chairman Leo Papas, "Our position hasn't changed."

For their part, conservationists fear the flood-control dam is really a big dam in disguise.

Charles Casey, an American River Coalition official, said environmentalists are concerned that gates on the dam's outlets could be closed in something less than a true emergency and the canyons would be flooded permanently.

USDA SOIL CONSERVATION SERVICE

RESPONSE TO COMMENT 1: Comment noted.

RESPONSE TO COMMENT 2: Under the current investigation, Sacramento River Flood Control System Evaluation, the Corps of Engineers has no authority to propose reconstruction work to correct for channel aggradation or degradation. The State of California (The Reclamation Board), as the local sponsor for the existing Sacramento River Flood Control Project, is responsible for maintaining and operating the system. If sediment deposition or channel aggradation is occurring, then it is the State's responsibility, if necessary, to remove material such that the design flow at that location can be conveyed at or within the authorized design water surface. The State does have an active program of sediment removal to insure that the project levees will continue to function as authorized and approved by Congress.

RESPONSE TO COMMENT 3: All alternative methods of reconstruction work proposed to correct for deficiencies inherent within the project levee embankments will have impacts on the environment. These impacts will be mitigated to minimize or eliminate any adverse impacts. Raising levees will require additional lands for fill material but every effort will be made to raise by using lands on the landward side of the levee. These lands are generally agricultural lands such that fill placed in these areas will not have significant environmental impacts. Drainage improvements have been and are part of ongoing maintenance programs but where such work is beyond the financial capability of local entities to implement, Federal assistance can and has been requested. Cut off trenches 20 to 30 feet deep, filled with slurry mix, are being constructed under Phase I of the Sacramento River Flood Control System in the Sacramento area to function as seepage barriers. Stabilizing berms are used to increase slope stability and to minimize or eliminate seepage problems and as such will insure that the levee embankments will not fail under design flood stages.

RESPONSE TO COMMENT 4: Adequate maintenance is necessary to maintain existing levels of flood protection within the Sacramento River Flood Control Project. An increased program of maintenance may be necessary if project levees begin to deteriorate and/or Federal funds are not made available to correct for project deficiencies.

The existing program of bank protection (Sacramento River Bank Protection Project) is a Corps authority separate from the Sacramento River Flood Control System Evaluation, that can and has been used to maintain the integrity of the project levees.

Levee reconstruction work proposed under the Sacramento River Control System Evaluation will be coordinated with the various local agencies to address concerns relating to other environmental and recreational plans developed for the study area.

CAREL D. VAN LÖBEN SELS
P. O. BOX 7
WALNUT GROVE, CA. 95690
916-776-1223

January 21, 1992

Colonel Laurence R. Sadoff
Sacramento District, U.S. Army Corps of Engineers
1325 J Street
Sacramento, CA. 95814

Dear Colonel Sadoff,

I attended a flood control hearing on January 16, 1992 at the Bates Elementary School in Courtland. Because of this proposed
1. flood control project, the residents and property in the Phase IV area south of Sacramento may be exposed to an increased flood risk.

Some of the problems with the proposed project are as follows:

2. 1. The cost/benefit study on the system must **NOT** be an incremental study. The entire project must be studied and if the results of the total cost/benefit study are favorable, then the entire system must be repaired.

3. 2. If upstream repairs to the system are completed before downstream repairs, then the residents in the last downstream repair area will be exposed to additional flood risk.

4. 3. If a repaired system allows additional urban development, then you must address the repaired system's limits in terms of 1955 or 1986 flood data and you must develop a plan that limits future releases by the proposed new urban developments.

If I can answer any questions please call me at the above number.

Sincerely,

Topper van Löben Sels

C. D. van Loben Sels

cc: Congressman Fazio
Congressman Herger
Congressman Matsui
Congressman Doolittle
Senator Seymour
Senator Cranston
Rodney Mayer, Reclamation Board Engineer
Victor Pacheco, Department of Water Resources

CARL D. VAN LOBEN SELS

RESPONSE TO COMMENT 1: The objective of the Sacramento River Flood Control System Evaluation, Phases I through V, is to determine the reconstruction work which is needed to insure that all levee embankments of the Sacramento River Flood Control Project can safely convey the design flood stages originally approved by Congress. Work being proposed is not designed to insure that floodflows greater than design conditions can be conveyed safely.

Peak flood stages in 1986 in the Phase IV study area were near, at, or above the design stages specified for those levees. Although those levee embankments and foundations did exhibit problems in some areas, particularly seepage type problems, flood stages similar to design conditions were safely conveyed. Even though our objective was met with regard to Phase IV levees, there are concerns about the known seepage areas. The Corps is evaluating these areas and may recommend reconstruction work such that these levees will continue to perform adequately under design conditions. If reconstruction work is needed and there is no Federal interest in providing funds under this investigation, then the local entities have the option of pursuing their own repairs if they so choose.

RESPONSE TO COMMENT 2: The Corps of Engineers has given extensive consideration to the use of a system economic approach for our evaluation of the Sacramento River Flood Control Project. The system economic approach would allow us to compare the total cost of reconstruction work needed for the Sacramento River Flood Control Project to the total benefits from such work. Current Corps' policy and guidance however, restrict us to an incremental evaluation of separable flood hazard areas. That is, reconstruction work need for project levees providing flood protection to a separable flood hazard area, such as Walnut Grove, must be economically justified based on flood damages prevented in that area by such work.

RESPONSE TO COMMENT 3: The 1986 flood event indicated that most of the downstream areas can convey flood stages similar to the originally authorized design conditions. Local entities, under existing maintenance and operation agreements, should and are urged, to repair levee embankment problem areas to insure that the levees will perform as designed.

RESPONSE TO COMMENT 4: During the 1986 flood event, peak flood stages and floodflows were near, at, or exceeded design conditions for most of the Sacramento River Flood Control Project. Two levee failures, several near levee failures, and numerous levee embankment problem areas, primarily seepage type problems, resulted. Many of these were reconstructed or repaired to insure that the project levees in those locations would safely convey the design flood stages originally authorized and approved by Congress. Reconstruction work proposed under Phases II through V would

address those problem areas that have not been repaired to date. Levee work required to repair levee embankments that have deteriorated over time and/or are deficient in order that the project levees will do what Congress initially authorized, are not considered responsible for inducing development. Local entities can make these same repairs at any time under existing maintenance agreements and, in fact, are urged to do so.

THE CITY OF WEST SACRAMENTO EST. 1987

COMMUNITY DEVELOPMENT DEPARTMENT

P.O. BOX 219 1951 SO. RIVER ROAD, WEST SACRAMENTO, CA 95691 (916) 373-5854

January 21, 1992

U.S. Army Corps of Engineers
Sacramento District
1325 J Street
Sacramento, CA 95814-2922
Attention: CESPK-PD-R

RE: Comments on Draft EIS/EIR for the Sacramento River Flood Control System Evaluation, Phases II-V

The City of West Sacramento Community Development Department offers the
1. attached comments on the above named EIS/EIR. Our general concern regarding the EIS/EIR is that it does not contain enough site-specific information on which to base an environmental document for future construction projects. The EIS/EIR implies that any site-specific project in the future will have to completely re-analyze impacts and mitigation measures for that particular project. Therefore, it is questionable whether a future site-specific project could rely on the EIS/EIR to qualify for a FONSI/Negative Declaration.

If you have any questions regarding these comments, please contact me or Ms. Terry Roberts of my staff at (916) 373-5854.

Sincerely,

Terry Roberts

for Harry R. Gibson, III
Principal Planner

Attachment
cc: Terry Roberts

COMMENTS ON THE DRAFT EIS/EIR FOR THE SACRAMENTO RIVER FLOOD CONTROL SYSTEM EVALUATION, PHASES II-V

January 21, 1992

The City of West Sacramento Community Development Department has reviewed the above draft and submitted the following Comments.

2. 1. As written, each subsequent project within each phase will require its own EIS/EIR rather than a FONSI and Negative Declaration. These documents will be necessary because this Programmatic EIS/EIR fails to associate specific mitigation measures with alternative construction techniques. As an example, page 34, last paragraph of section 7.0 states that future environmental commitments will be made on a site specific basis. As such, the opportunity to consider the programwide mitigation measures at an early time is lost.

By establishing standard mitigation measures for all sites and each construction measure as part of the program EIS/EIR, subsequent review may evaluate whether or not extraordinary measures are necessary at a particular location. If no new measures are necessary, a FONSI and Neg. Dec. would then be appropriate. The types of specific mitigation measures which could be included within this document include: Transplanting of Elderberry shrubs, dust control, traffic control, erosion fencing, reseeding, hours of operation, specifics about avoiding Swainsons Hawk nesting sites, etc.

3. 2. A concise listing of the impacts and mitigation measures is needed at the beginning of the document.

4. 3. A listing of impacts found not to be significant would assist the reader in filling in the gaps in the text. If, for example, truck impacts to traffic along haul routes is not a significant impact, the topic could be addressed in this type of section.

5. 4. Additional mitigation is required for staging areas. Not only should there be protection for waters from petroleum spills, there should also be protection for dirt areas to preclude surface contamination from spills, maintanence activities and operations.

6. 5. Additional detail is needed on the scope of the project. It is not until Appendix D page 4 that the reader learns the initial scope of work for phase III. If there are known or reasonably anticipated problems with selected levee sections, these should be shown in the project "plates" (with a disclaimer if necessary). It would also help the reader put the project in perspective to show the areas endangered by the known or suspected problem sections. By doing this, the reader may relate the impacts to the possible flood losses.

CITY OF WEST SACRAMENTO
COMMUNITY DEVELOPMENT DEPARTMENT

RESPONSE TO COMMENT 1: As noted in Section 2.4 Scope and Objectives of the EIS/EIR, the actual reconstruction sites will not be finalized until advanced phases of engineering and design are completed. It is expected that future project activities will be within the range discussed in this EIS/EIR and that an Environmental Assessment (EA) will provide adequate environmental documentation. However, if the Corps of Engineers and State Reclamation Board conclude that additional environmental analysis is required, a supplemental EIR/EIS will be prepared. This document would be prepared in full compliance with NEPA and CEQA and would be circulated for public review and comment.

RESPONSE TO COMMENT 2: A key objective of this EIS/EIR is to describe alternative methods of levee reconstruction which are environmentally preferable and to identify reasonable and justifiable mitigation measures to eliminate, compensate or minimize significant impacts from the proposed work. However, as specific work sites and selected methods of levee reconstruction cannot be determined at this time, it is not possible to determine specific mitigation measures. As noted in Sections 1.51 Federal Requirments and 1.52 State Requirements and 7.0 Environmental Commitments, the Corps is obligated to provide mitigation. For a discussion of impacts of levee reconstruction on existing conditions, please see Section 5 of the PEIS. Although the impacts are organized according to the affected resources, these impacts are still further categorized by construction method. Table 2 summarizes impacts and mitigation associated with the different alternatives.

RESPONSE TO COMMENT 3: A summary table of impacts associated with the alternatives and mitigation measures is added as Table 2.

RESPONSE TO COMMENT 4: Section 4.0 Environmental Setting includes those resources not likely to be adversely impacted. Section 5.0 Affected Environment lists those resources that could be adversely impacted.

RESPONSE TO COMMENT 5: Text has been revised to include additional mitigation measures for petroleum spills on dirt areas.

RESPONSE TO COMMENT 6: Specific details for each phase will be presented for each individual EA. The level of detail will be much finer in these documents. Geotechnical investigations will be carried out for each phase, and based on the acquired information, levee repair methods will be prescribed.

TO: Defense Technical Information Center
ATTN: DTIC-O
8725 John J. Kingman Road, Suite 0944
Fort Belvoir VA 22060-6218

22 October 2008

FROM: US Army Corps of Engineers
Sacramento District Library
1325 J Street, Suite 820
Sacramento CA 95814-2292

SUBJECT: Submission of technical reports for inclusion in Technical Reports Database

The enclosed documents from USACE Sacramento District are hereby submitted for inclusion in DTIC's technical reports database. The following is a list of documents included in this shipment:

- ADB344304 • Lemon Reservoir Florida River, Colorado. Report on reservoir regulation for flood control, July 1974
- ADB344333 • Reconnaissance report Sacramento Metropolitan Area, California, February 1989
- ADB344346 • New Hogan Dam and Lake, Calaveras River, California. Water Control Manual Appendix III to Master Water Control Manual San Joaquin River Basin, California, July 1983
- ADB344307 • Special Flood Hazard Study Nephi, Utah, November 1998 (cataloged)
- ADB344344 • Special Study on the Lower American River, California, Prepared for US Bureau of Reclamation – Mid Pacific Region and California Dept. of Water Resources…, March 1987
- ADB344313 Transcript of public meeting Caliente Creek stream group investigation, California, held by, the Kern County Water Agency in Lamont, California, 9 July 1979
- ADB344302 • Initial appraisal Sacramento River Flood control project (Glenn-Colusa), California, 10 February 1989
- ADB344485 • Report on November-December 1950 floods Sacramento-San Joaquin river basins, California and Truckee, Carson, and Walker rivers, California and Nevada, March 1951
- ADB344268 • Reexamination Little Dell Lake, Utah, February 1984
- ADB344197 • Special report fish and wildlife plan Sacramento River bank protection project, California, first phase, July 1979
- ADB344264 • Programmatic environmental impact statement/environmental impact report Sacramento River flood control system evaluation, phases II-V, May 1992
- ADB344201 • Hydrology office report Kern river, California, January 1979
- ADB344198 • Kern River – California aqueduct intertie, Kern county, California, environmental statement, February 1974
- ADB344213 • Sacramento river Chico Landing to Red Bluff, California, bank protection project, final environmental statement, January 1975
- ADB344265 • Cottonwood Creek, California, Information brochure on selected project plan, June 1982
- ADB344261 • Sacramento river flood control project Colusa Trough Drainage Canal, California, office report, March 1993
- ADB344343 • Detailed project report on Kern River-California aqueduct intertie, Kern County, California, February 1974

- ADB344267 Sacramento River Flood Control Project, California, Right Bank Yolo Bypass and Left Bank Cache Slough near Junction Yolo Bypass and Cache Slough, Levee construction, General Design, Supplement No. 1 to Design Memorandum #13, May 1986
- ADB344246 Redbank and Fancher Creeks, California, General Design Memorandum #1, February 1986
- ADB344260 Cache Creek Basin, California, Feasibility report and environmental statement for water resources development Lake and Yolo counties, California, February 1979
- ADB344199 Sacramento River Deep Water Ship channel, California, Feasibility report and environmental impact statement for navigation and related purposes, July 1980
- ADB344263 Sacramento River flood control project, California, Mid-Valley area, phase III, Design Memorandum, Vol. I or II, June 1986
- ADB344262 Marysville Lake, Yuba River, California, General Design Memorandum Phase I, Plan Formulation, Preliminary Report, Appendixes A-N, Design Memorandum #3, March 1977

The **distribution statement is A** approved for public release; distribution is unlimited.

The Sacramento District source code is **410637**. Please return any materials that aren't appropriate for the technical reports database.

Please acknowledge receipt of shipment by sending email message to Frances.J.Sweeney@usace.army.mil.

Thank you,

Frances J. Sweeney
Library Manager
USACE, Sacramento District Library
916-557-6660